The IRON AGE

October 22, 1959 A Chilton Publication The National Metalworking Weekly

★ Special Metal Show Features

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What Does the Future Hold For the Metals Industry? – P. 177

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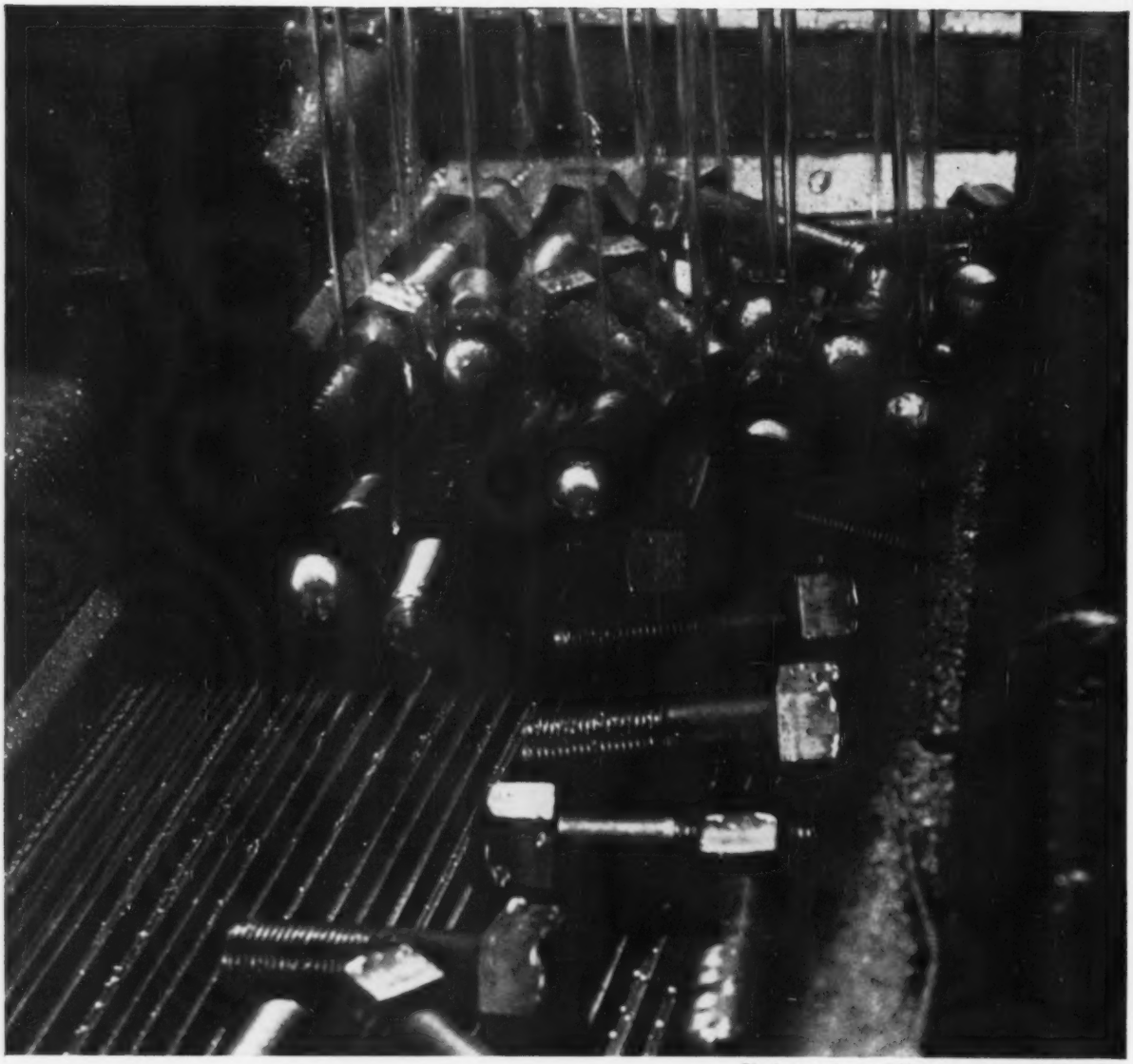

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The IRON AGE

October 22, 1959—Vol. 184, No. 17

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minum and Magnesium Div. can help its industry. Above, head of A & M, Arthur Snow (l.) confers with BDSA deputy administrator H. Herbert Hughes. P. 165

FUEL CELL

Powers Tractor—First full-scale application of fuel cells to power vehicles has been demonstrated. The new power source, installed in a tractor, shows it gives greater efficiency than gasoline engines. P. 170

PRODUCTION STALLS

Layoffs Mount—The auto industry grinds to a halt as steel runs out. It will take weeks for production to get back to normal after the steel strike ends. Effects will be felt on

Metalworking

◀ COVER FEATURE

LATEST FINISHES: Today's producers of metal products say that present nonmetallic finishes are the best ever. At Enamel Products & Plating Co., McKeesport, Pa., such coatings are applied to wide coils of J & L sheet stock. P. 199

the market for months to come, automakers fear. P. 181

MONEY COSTS

Rates to Climb—Money costs are expected to reach new highs in the next few months. However, consumers are still continuing to buy on credit. P. 185

FEATURE ARTICLES

HOW TO GET MORE FROM YOUR COATED METALS

Why Make the Switch?—There's a sharp upswing in sales of precoated sheet and strip. Don't let their high initial costs fool you. Their end-product costs can be lower than the materials you're now using. And there are many varieties to choose from. P. 200

Sales Appeal—When you combine the exciting colors, interesting patterns and good design of these materials, you're bound to get a bigger piece of the market. Plastic-on-metal materials have caught the buyer's eye. P. 202

Durable Too—Whether it be for resistance to abrasion, weathering chemicals or heat, the real test of a material comes from actual use. Put to both standard and unorthodox tests, many of them will prove they can serve far beyond their intended use. P. 205

Easier Forming — The coatings won't cause forming problems. In fact, they'll simplify operations. You can feed them right into drawing, forming, and bending steps with standard equipment. And you can buy coated metals in coil form as well as flat sheets. P. 208

Join Like Steel—You can assemble piece parts much like any unfinished sheet metal part. No costly retooling or special techniques are required. But there are a few limitations that should be considered during the initial planning stage. P. 211

MARKETS & PRICES

ELECTRONICS

Record Year—The electronic industry is having a record sales year. Leaders say this is only the first of many prosperous years for the electronic industry. P. 167

AUTOMATION

Post Office—Mail will be sorted at a much faster pace now that the Post Office Dept. has installed its new automatic letter sorter in Detroit. P. 169

AUTOMATION TASK FORCE

Solves Manufacturing Problems—GE sets up an automation consulting service for its departments to help them make more profitable use of automation. P. 189

STEEL TIMETABLE

Delivery Dates—It will take from four to six weeks before steel shipments are in balance after the mill startup. Allocation will be strict for months. P. 287

DATA PROCESSING

Benefits for Purchasing — Data processing equipment can be a valuable addition to the purchasing function. P. A.'s who have installed data processing give would-be users a few tips. P. 288

NEXT WEEK

MINIATURIZATION

Road of Tomorrow—Next week's technical feature discloses ways to pack more control equipment in less space. Electric actuation joins with hydraulics to open new areas in miniaturization, adding to present knowledge.

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E. H. WERNER, *Production Control Manager, Lamson & Sessions, tells why...*

It's costly to be close-mouthed in ordering fasteners

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What quantity is required . . . and when? To give you economical production runs, using the most efficient tooling methods, we need specific information. Give us *realistic* quantities — how many must be shipped by a given time—what you expect future usage to be—delivery intervals required. This gives you maximum economy.

What are the physical requirements? Give us the "physicals" and let us recommend the suitable material. When prints specify a steel not commonly used, it must often be procured at a premium, which adds to your cost.

What are the critical dimensions? Close tolerances invariably add to cost. If you indicate which non-critical dimensions might be modified—radii, angles, fillets, lengths, outside and inside diameters, concentricity, etc.—we can often eliminate expensive secondary operations.

What quality level is required? This determines whether 100% inspection is necessary, sample inspection is adequate, or only certain dimensions must be inspected.

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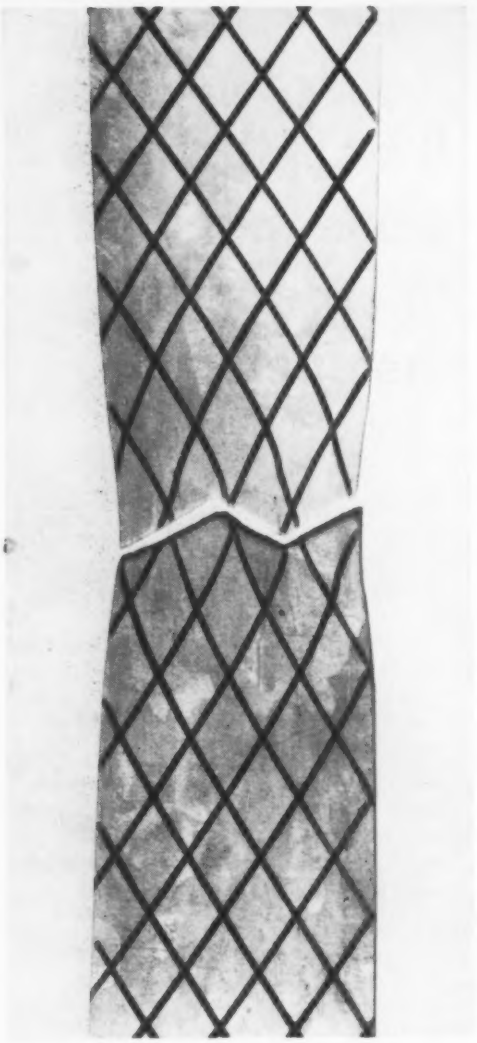

New steels are born at Armco

70% stretch does not flake or peel coating on Armco ZINCGRIP Steel

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Art of Communications: Much Harder Than You Think

There are many examples of poor communications. But the steel labor hassle will top them all for years to come.

Even though there were "tons" of releases from both sides during the six-months long fight, at the end of that time many were still confused.

Probably the greatest single statement made was by Chairman Taylor of the Taft-Hartley panel. He said, after two days of hearings, that he did not understand the issues.

Apart from the damage done by the steel strike (and maybe the long-term good from sticking to principles) something has been proved: Management and unions do not speak the same language. If they do, they don't communicate.

When Washington newsmen took over—after other newsmen had covered this fight-of-the-century for months—the usual optimistic feelings were generated, only to be knocked in the head when later statements came from both sides.

The politicians so far still do not know what the basic issues were—or are. But their need to communicate is not the same as is management's and workers'. What they do relates to opportunities for re-election.

The serious part of the steel misunderstanding is the proof that hopelessness is probable when neither side reaches the point where confidence and mutual cooperation seem possible. This is true especially in steel, because no matter what the settlement, serious damage to relationships has occurred.

Even the damage to future relations is not yet understood by either side. Steel negotiators say in private that steel union chief McDonald did not bargain. The very same statement comes from Mr. McDonald about steel negotiators. Both feel that they mean what they say.

The battle in public print with releases and advertisements changed nothing. Few, if any, workers were impressed by management's story. Neither were the industry's friends and customers sold on the union view.

The upshot of this complete failure to communicate with each other for so long suggests that when neither side reaches the other, merely repeating the words "collective bargaining" means nothing at all.

The real challenge comes after the settlement if complete understanding on both sides is to be restored.

Tom Campbell

Editor-in-Chief

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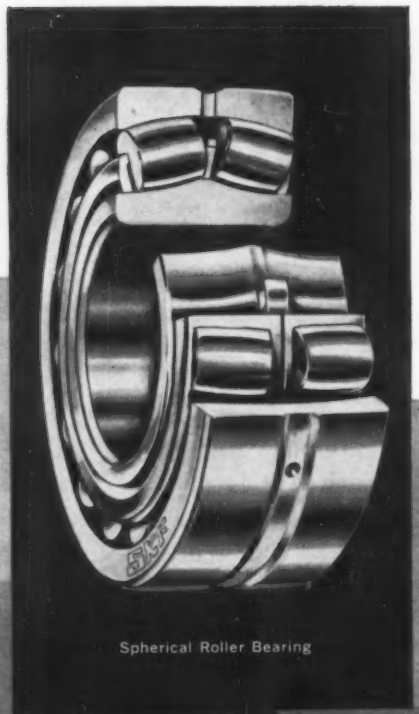
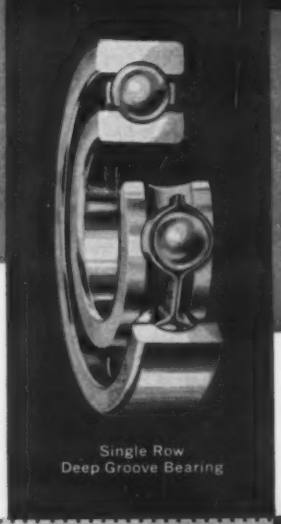


Spherical Roller Bearing

Angular Contact Bearing

Spherical Roller Thrust Bearing



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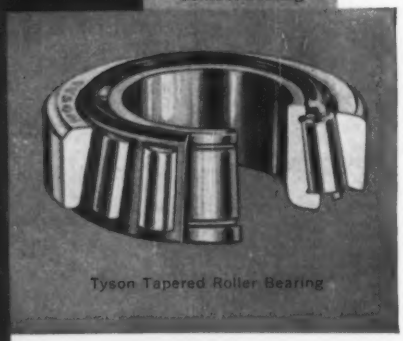

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Economies Spur Oxygen Use

Oxygen has been going into electric furnaces for years. But a wave of new interest is developing as electric furnace operators are spurred by reports of L-D process economies. Increased availability of liquid oxygen, in small storage tanks which can be established on the mill or foundry property, is the added touch. Gas makers report a heavy increase in inquiries from electric furnace operators.

Pressure-Pour Mill Shapes

Controlled pressure pouring, patented by Griffin Wheel Co., is getting wide interest from steelmen. Now being used for the casting of steel wheels for freight cars, it will be tested for the production of semifinished steel mill shapes, such as blooms, slabs, billets, and tube rounds.

Discuss Corroding Plastics

A new report, released to industry by the Office of Technical Services, discusses the corrosion of metals by rubbers and plastics. It tells why this happens, what can be done about it, and which materials are the most corrosive. The cause appears to be the release of electrolytes which concentrate on the metal surfaces.

Casts Extrusion Stock

The development of a new process and equipment for the continuous casting of aluminum slabs was recently announced. These slabs are being supplied to impact extruders whenever a cast structure is acceptable. Economies gained will permit impact extruders to enter new markets.

Army Vehicle of Aluminum

Aluminum ballistic armor plate will be used in the first production of the Army's new M-113 personnel carrier. Made from high-strength, weldable 5083 aluminum alloy, the 9-ton amphibious tracked vehicle will replace a present 20-ton steel M-59 carrier. Armor on the M-113 gives as much protection against shell fragments and small arms fire as the steel on the M-59. The powerplant and many of the M-113's component parts are also aluminum.

Lead Material Cuts Noise

New lead-containing material is being used successfully in abating noise in conventional and jet air liners and helicopters. It is a lead powder impregnated vinyl-coated cotton duck or woven glass fabric. It combines the acoustical properties of lead, high decible lowering per pound, with the strength-flexibility of vinyl, glass, or cotton.

Germany Feels Shortage

New light on the effects of the steel shortage is shed by word that a German manufacturer of automobiles is shutting down for lack of steel. The announcement points up the fact that a world shortage is developing. For some products at least, foreign countries still have a steel deficit.

Eases Brazing of Ceramics

Metallizing ceramics with the molybdenum-manganese process, prior to brazing, makes joining to metal assemblies easy. It is being used for vacuum tubes which must: withstand high bake-out temperatures, exhibit good mechanical and thermal shock characteristics, take high voltages. In addition, the brazing can be done in hydrogen; this eliminates brazing alloy evaporation.

Cold-Chamber Diecasting

Production experience with cold-chamber diecasting techniques confirms early optimism. The semiautomatic method gives better parts, overcoming many previous difficulties. This means a better use of materials along with cuts in both direct labor and materials costs. These results should make the light metal more competitive in high-volume applications.

LIGHT GAUGES

at High Speeds

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Each step toward paper-thin tin plate accentuates the operating problem. Tracking becomes more acute as speeds increase. Coils increase in diameter and weight. Tension becomes more critical.

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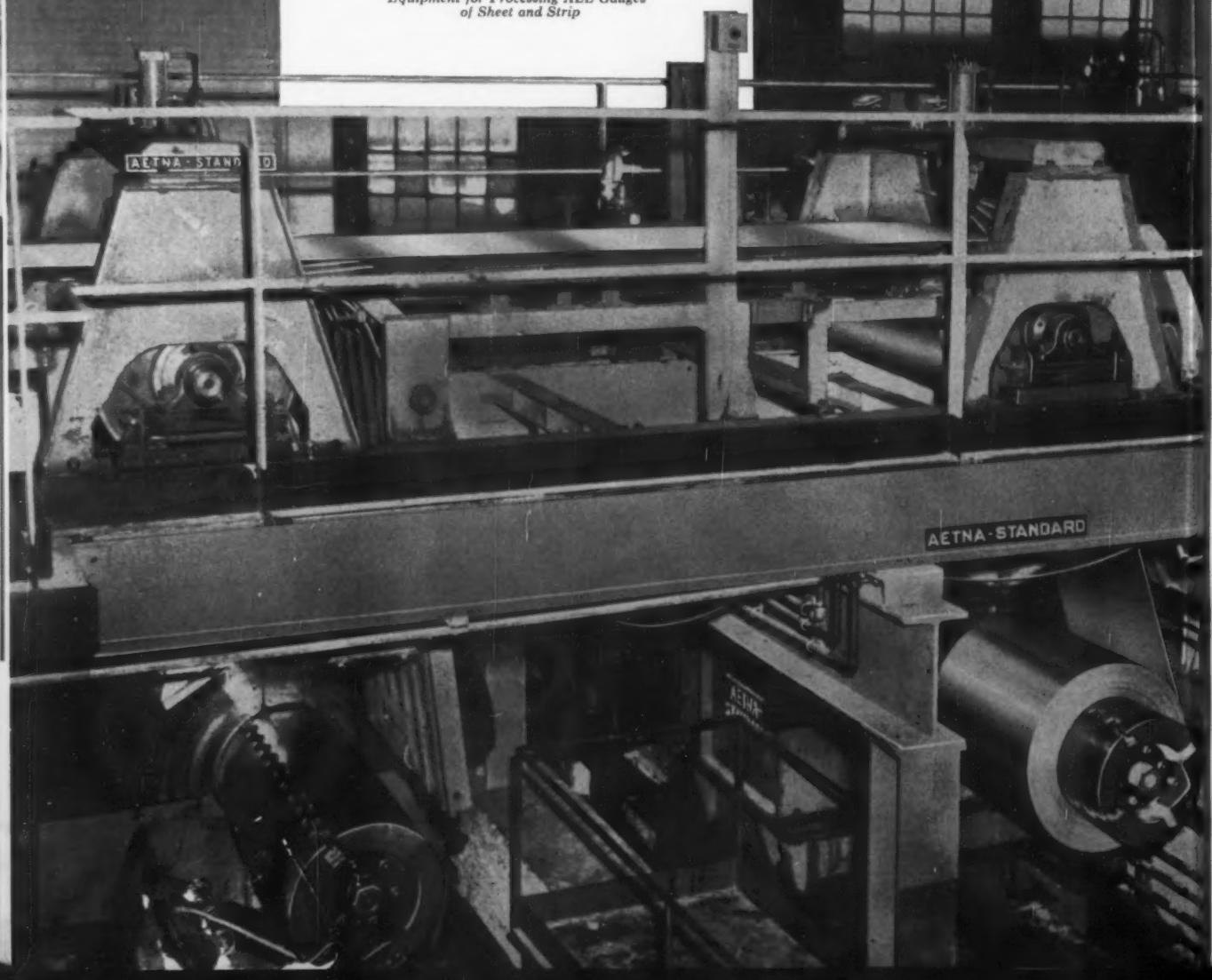

Modern Marketing

Sir—I would appreciate receiving reprints of the articles on "Modern Marketing" which appeared in the following issues: Aug. 27: How the "Marketing Concept" Helps Launch New Products; Sept. 3: Code Customer Prospects for Effective Sales Effort; Sept. 10: Use Data Processing to Direct Your Marketing Operation; Sept. 17: A Target Account System Can Increase Your Sales.—C. W. Benson, Crucible Steel Co. of America, Pittsburgh.

Sir—If reprints of the four articles in the "Modern Marketing" series are still available I would greatly appreciate your forwarding copies.

I read all four articles as they appeared, and intended to tear them out for future reference. Now I find that some are missing.—S. D. Groff, Adv. Mgr., Mexico Refractories Co., Mexico, Mo.

Sir—Please forward 15 copies of your article, "A Target-Account System Can Increase Your Sales," in the Sept. 10 issue.—W. K. Dorman, Asst. Mgr., Stainless Steel Products, U. S. Steel Corp., Pittsburgh.

Sir—Please send me one reprint of each of the recent articles on marketing which appeared in The IRON AGE.—J. R. Crossgrove, Marketing Research-Product Planning, Foundry Dept., General Electric Co., Schenectady, N. Y.

▪ **Reprints will be mailed.—Ed.**

Trade War

Sir—Recently I read your Report to Management item on "Why Trade Battle Grows." (Sept. 10 issue.) In it you quote me in support of the belief that our "troubles with foreign competition in world markets" are not merely temporary.

May I add that U. S. foreign economic policy moved relentlessly toward reduction of our outward competitive defenses in three respects: (a) We reduced our tariffs to the point where the average protective level today is only 20 pct of what it was 25 years ago; (b) We helped other countries with modern machinery shipments, billions of dollars worth of it, thus greatly increasing their productivity, and (c) We led thousands of foreign productivity teams through our factories.

Also, domestic economic policy just as relentlessly escalated us onto a high cost plateau via minimum wage and maximum hours legislation, obligatory collective bargaining, farm price supports, etc.

Unless we practice some restraint on imports, our economy will have to meet foreign economies on our way down as they come up. There are those who say we must become more efficient, automate more, but other countries are now capable of the same thing; and they are on our heels.—O. R. Strackbein, chairman, The Nation-Wide Committee on Import-Export Policy, Washington.

"If I can't think of anything to say at these meetings, I just make a speech."

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For a complete survey of your strip problems at no cost or obligation, write for field engineer or Confidential Data Blank.

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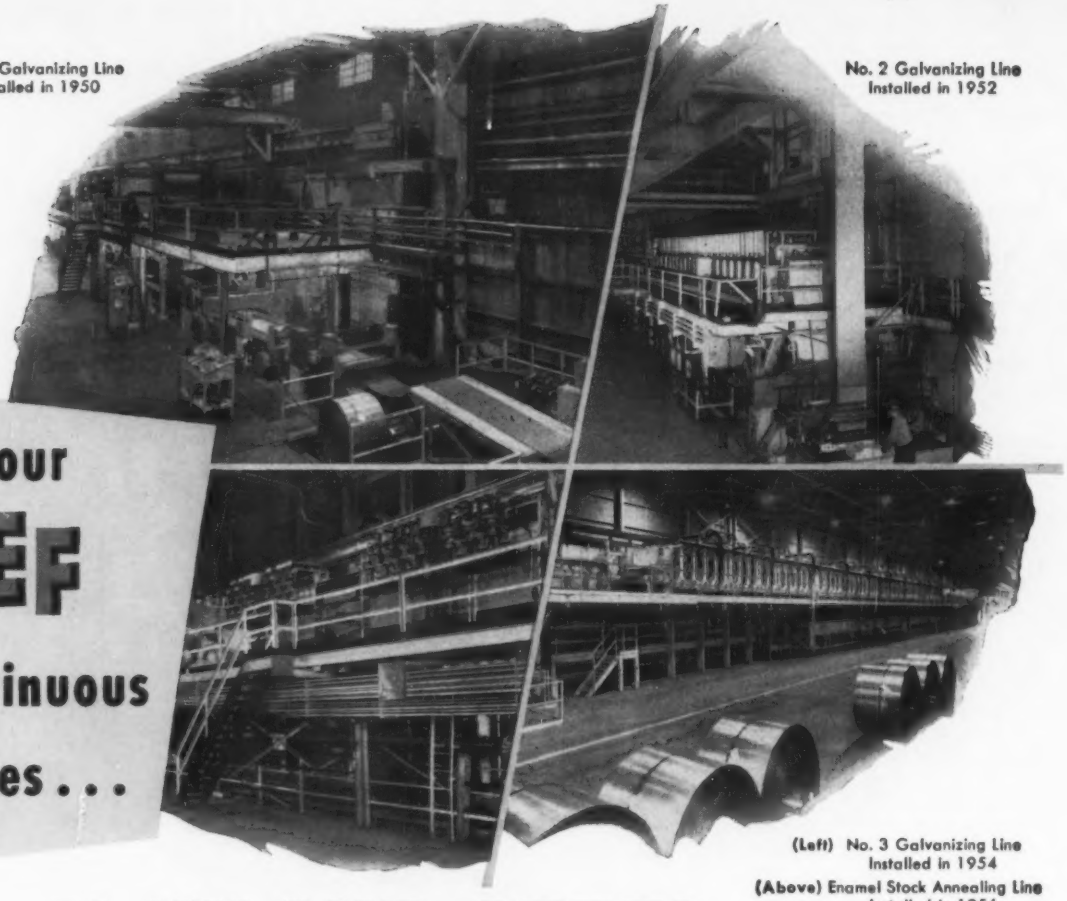

No. 1 Galvanizing Line
Installed in 1950

No. 2 Galvanizing Line
Installed in 1952

(Left) No. 3 Galvanizing Line
Installed in 1954

(Above) Enamel Stock Annealing Line
Installed in 1956

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A Look Ahead

In this issue of The IRON AGE —our annual Metal Show Issue— we're taking you ahead to the metalworking world of the future. In a special, three-page article starting on p. 177 you'll find a full-scale forecast on metalworking trends in both methods and materials. It's based on reports by key executives in the metals industry. Together, they answer the question, "What does the future hold for metalworking?"

Also in this Metal Show Issue you'll find another in The IRON AGE Metalworking Dollar Series. This time the subject is metal coatings. It's a comprehensive roundup on the modern coatings covering the types available, their purposes, and how best to buy them. "How to Get More for Your Coated Metals Dollar" begins on p. 199.

In addition, there's the usual detailed preview of the new materials and equipment you find at the Metal Show — held Nov. 2-6 at the International Amphitheatre, Chicago.

At Home on Pad 9

If you're interested you can pick up a bargain in a Navaho missile launcher if you put in a bid at Robbins Air Force Base, Ga., on Oct. 26.

But geting it home in your car from its location, Cape Canaveral, Fla., will be a bit difficult. It weighs about 2 million pounds.

As missile launchers go, it sounds like a dandy. You'll get a 70 ft long tower, a hydraulic lowering and raising system, two elevators, stairs, a fire fighting unit, a water cooling system, and an electrical control panel.

For a pre-auction look you can inspect the launcher (while escorted) at Pad 9, Missile Launching Area, Cape Canaveral, Fla.

Too Many Hyphens

In these days of metal stockpiles and farm surpluses there's a new over-supply. It's hyphens.

The reason: Electric Auto-Lite Co. is now the Electric Autolite Co. Company officials eliminated the (-) because it separated two words, thus making it appear Autolite made autos and light bulbs. Actually the company makes neither. It does manufacture over 400 other items for cars, trucks, tractors, planes, and boats.

New Puzzler

Here is a multiple answer problem with a new twist. Mr. Schechtman has 21 coins which total $1.00. The question is how many different combinations could he have. The reader with the highest number is the winner.

"Your cash award, Barton. . . . How do you want it?"

IT'S THE FINISH THAT COUNTS

IN TUBING TOO!

TESTS PROVE PRECISION FINISH UNSURPASSED

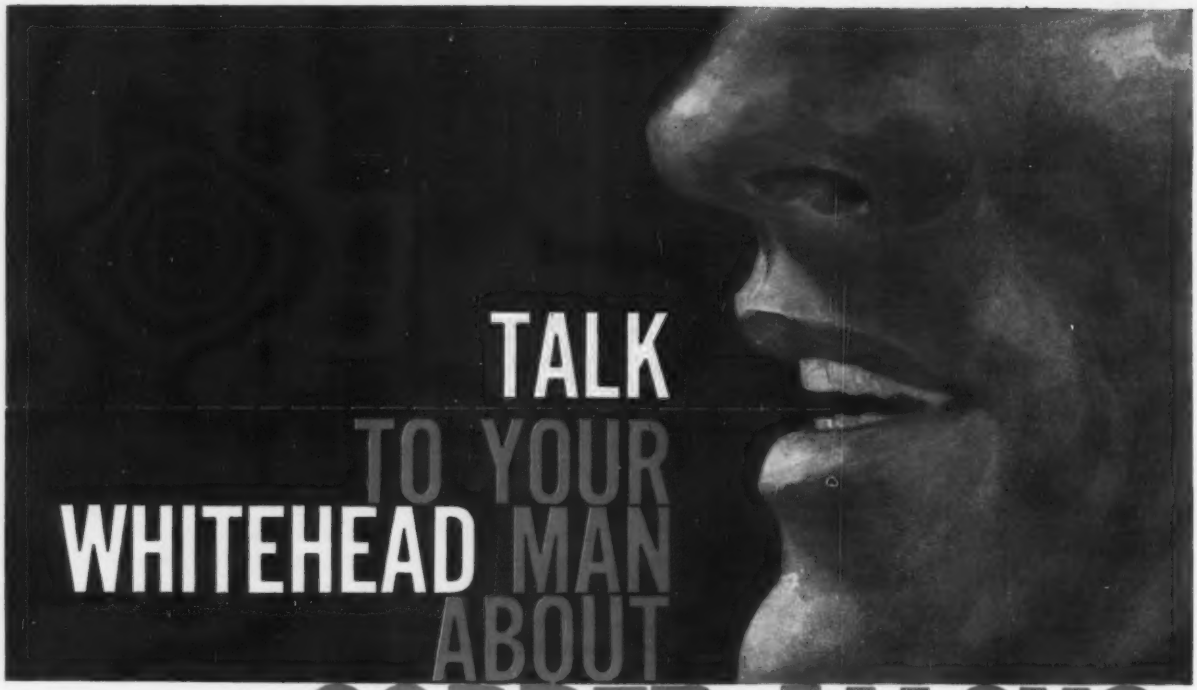
Shape, size, alloy are important in tubing and Precision Tubing excels in all . . . but finish is an outstanding quality of Precision Tubing where specified . . . and at no extra cost.

Precision Tubing is available in clean, scratch-free finishes suitable for anodizing or plating to mirror finishes. In sizes from .010" to 1.125" O.D. in copper, brass, aluminum, up to ⅜" O.D. in nickel and nickel alloys.

Other Precision Tubing is available in straight lengths, coils, preformed to specified shapes . . . and also as Coaxitube the metal shielded coaxial conductor. Whatever your designs or requirements for fine accurate tubing at regular tube prices order Precision Tubing. Write for complete technical data to Dept. 10, Precision Tube Company, Inc., North Wales, Pa.

GET THIS NEW TUBING DATA CATALOG . . . FREE!

PRECISION TUBE COMPANY



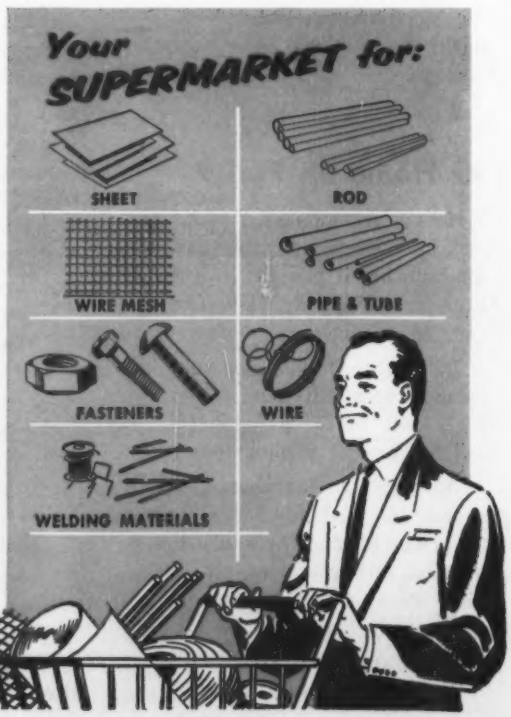
COPPER ALLOYS

Brass, Bronze and many others are stocked in the forms you use

Copper is a key item in the Whitehead line. We maintain large stocks of Copper in many different alloys, such as Tough Pitch Copper, Yellow Brass, Muntz Metal and Tempaloy. You can get these products to meet MIL, ASTM, or other standard specifications.

Stocks of well over 1000 sizes of rod, pipe and tube, almost 500 items of sheet, thousands of fasteners and even twelve different sizes of a specialty item like round telescopic brass tubing, make Whitehead a true "Supermarket" of Copper alloys—no matter what your requirements.

Since we stock all the principal corrosion resistant metals—Aluminum, Clad Metals, Monel, Inconel, Stainless Steel and Plastics, too—we can and do give unbiased opinions on the right material to do the job. Anytime you need anything in the corrosion resistant line, you'll find it pays to call Whitehead first. Interested in Specification Numbers as they apply to Copper Alloys? Write for Publication B-34D.



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Other offices and warehouses: **PHILADELPHIA • BUFFALO • HARRISON, N. J. • CAMBRIDGE, MASS. • SYRACUSE • BALTIMORE • ROCHESTER • WINDSOR, CONN.**

COMING EXHIBITS

Metal Show — Nov. 2 - 6, International Amphitheatre, Chicago. (American Society for Metals, Metals Park, Novelty, Ohio.

Air-Conditioning & Refrigeration Show — Nov. 2-5, Atlantic City, N. J. (Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N.W., Washington, D. C.)

MEETINGS

OCTOBER

American Machine Tool Distributors' Assn.—Annual meeting, Oct. 25-27, The Statler Hotel, St. Louis. Association headquarters, 1900 Arch St., Philadelphia.

American Gear Manufacturers Assn.—Semi-annual meeting, Oct. 25-28, The Edgewater Beach Hotel, Chicago. Association headquarters, One Thomas Circle, Washington 5, D. C.

Scientific Apparatus Makers Assn. — Midyear meeting of Industrial Instrument Section, Oct. 25-29, Camelback Inn., Phoenix, Ariz. Association headquarters, 20 N. Wacker Drive, Chicago.

Rolling Mill Machinery & Equipment Assn.—Annual meeting, Oct. 26, Duquesne Club, Pittsburgh. Association headquarters, 1026 Farmers Bank Bldg., Pittsburgh.

Hoist Manufacturers Assn., Inc.—Meeting, Oct. 27, Warwick Hotel, Philadelphia. Association headquarters, One Thomas Circle, Washington 5, D. C.

The Assn. of American Battery Manufacturers Inc. — Fall convention, Oct. 29 - 31, The Palmer House, Chicago. Association headquarters, 19 N. Harrison St., E. Orange, N. J.

National Metal Trades Assn.—Convention, Oct. 29-31, Sheraton-Biltmore Hotel, Providence, R. I. Asso-

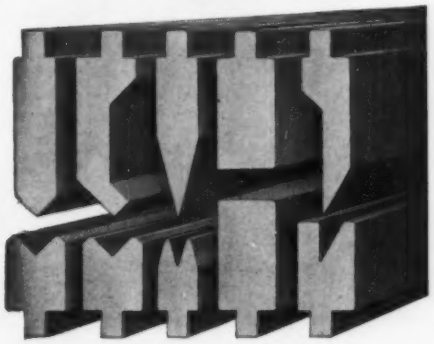
(Continued on P. 16)

ALABAMA
Birmingham
Hinkle Supply Co., Inc.—FAirfax 2-4541
CALIFORNIA
Los Angeles
Meyer Sheet Metal Mchry. Co.—VAn Dyke 1477
San Francisco
Harron, Rickard & McCone Co.—ATwater 2-2202
GEORGIA
Atlanta
Allison Mchry. Co.—JAckson 4-1741
INDIANA
Indianapolis
E. L. Humston Co., Inc.—WAlnut 5-9691
IOWA
Bonaparte
Corry's Machine & Tool Co.—Phone: 112
KANSAS
Wichita
Elifeldt Mchry. & Supply Co.—AMherst 7-9773
MASSACHUSETTS
Cambridge
Austin-Hastings Co., Inc.—Kirkland 7-4480
MICHIGAN
Detroit
J. Lee Hackett Co.—TRinity 2-6442
MINNESOTA
Minneapolis
Minnesota Steel & Mchry. Co.—FEderal 3-6273
MISSOURI
Kansas City
Elifeldt Mchry. & Supply Co.—Victor 2-5494
NEW YORK
New York
Federal Machinery Corp.—CAnal 6-3022
Triplex Machine Tool Corp.—EMpire 1-1700
H. Weiss & Co.—CAnal 6-4256
NORTH CAROLINA
Greensboro
Armentrout Mchry. Co.—Phone: 4-8218
OHIO
Columbus
Vorys Brothers, Inc.—AXminster 4-4701
OKLAHOMA
Oklahoma City
Hart Industrial Supply Co.—REgent 9-2541
Tulsa
Hart Industrial Supply Co.—LUther 3-2175
OREGON
Portland
Pacific Metal Co.—CApitol 7-0693
PENNSYLVANIA
Philadelphia
Delaware Valley Mchry., Inc.—OLdfield 9-4600
Milton Equipment Co.—WAlnut 2-1734
Pittsburgh
Wm. K. Stamets Co.—ATlantic 1-8091
TEXAS
Dallas
Briggs-Weaver Mchry. Co.—LAkeside 8-0311
Fort Worth
Briggs-Weaver Mchry. Co.—EDison 6-5621
Houston
Mehl Machinery, Inc.—FAirfax 3-1313
WASHINGTON
Seattle
Pacific Metal Co.—MAin 6925
WISCONSIN
Milwaukee
Production Equip. Inc.—GReenfield 6-6075

CANADA
A. R. Williams Machinery Co., Ltd.
ALBERTA
Calgary—Phone: 5-4425
Edmonton—Phone: 24341
BRITISH COLUMBIA
Vancouver—TAtlow 9411
Victoria—Phone: 4-7623
MANITOBA
Winnipeg—SPruce 4-4458
NOVA SCOTIA
Halifax—Phone: 5-4389
ONTARIO
Hamilton—JAckson 9-5388
Ottawa—CEntral 6-3661
Toronto—EMpire 4-2381
Windsor—CLearwater 4-4762
QUEBEC
Montreal—Riverside 8-9381

8925

Off-the-shelf DELIVERY



CHICAGO®
Induction Hardened*
PRESS BRAKE DIES

This organization of local distributors offers immediate delivery on many CHICAGO *induction hardened* press brake dies. These stock dies are economical, and the quick delivery saves time in tooling. They are available in any length from 4 to 12 feet in increments of 2 feet.

Stock dies are used for a surprisingly large variety of bending operations. And, with CHICAGO *induction hardened* dies you get bonus performance and increased die life at no extra cost. Remember, these dies can be used in any make or size of standard press brake.

On your needs for press brake dies, call your nearest distributor listed here. With Bulletin D-457 you can order by number. Ask for a copy.

*Induction hardening is a special, high-frequency process used to harden the wear surfaces of CHICAGO dies. Field reports on CHICAGO *induction hardened* dies show up to ten times longer life than conventional press brake dies.

CHICAGO DREIS & KRUMP

Press Brakes, Press Brake Dies
Straight-Side-Type Presses

Hand and Power Bending Brakes
Special Metal-Forming Machines

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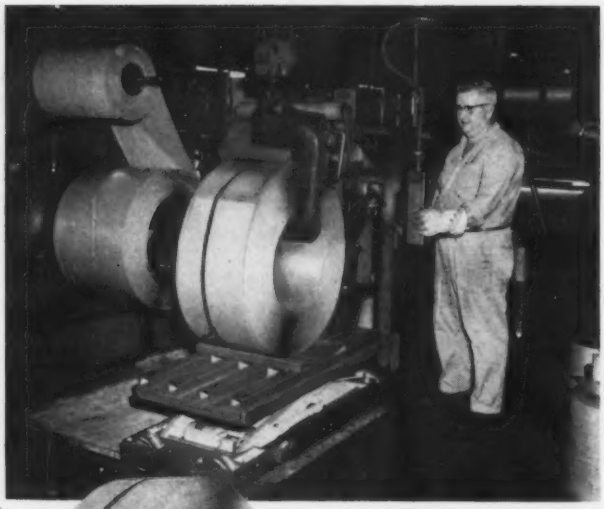
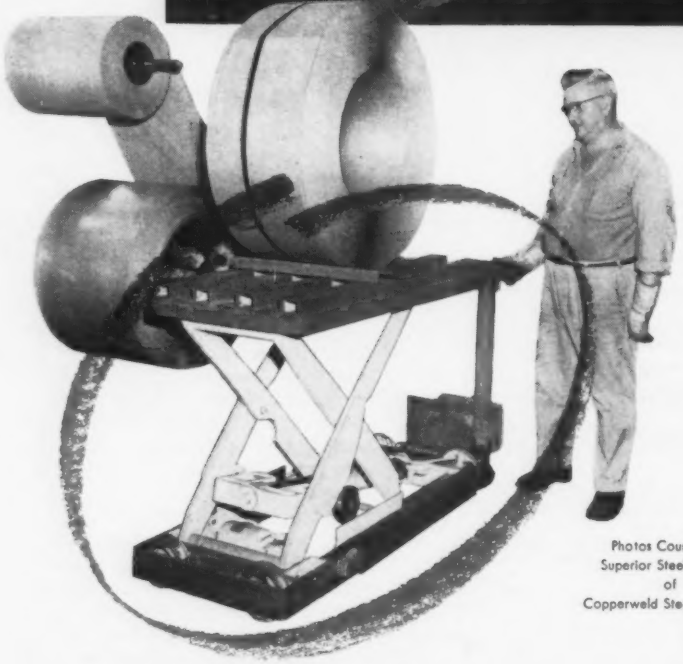
MANUFACTURING CO.
7430 South Loomis Boulevard
Chicago 36, Illinois





Photos Courtesy of
Superior Steel Division
of
Copperweld Steel Company

SOUTHWORTH "CUSTOM ENGINEERING" SOLVED THE COIL HANDLING PROBLEM AT SUPERIOR STEEL

The "coil buggy" shown is one of several 5000-pound capacity, mobile and adjustable hydraulic Southworth Lift Tables* specially adapted for use at recoilers of Superior Steel with a triple purpose: (1) to safeguard workmen by reducing accident hazards; (2) to protect the highly polished surfaces of the quality stainless strip steels; and (3) to increase efficiency by facilitating the handling of the coils from the recoiler. The success scored by this installation is one more example of how Southworth engineers cut costs through improved use of existing facilities. Why not let Southworth help you increase safety, efficiency and handling at *your* plant? Write:

*PATENT PENDING

SOUTHWORTH MACHINE CO. since 1890

SOUTHWORTH LIFT TABLES

a division of SOUTHWORTH MACHINE CO., 4810 Warren Ave., Portland, Me.

EXHIBITS, MEETINGS

(Continued from P. 15)

ciation headquarters, 337 W. Madison St., Chicago.

NOVEMBER

Society for Non-Destructive Testing, Inc.—Annual convention, Nov. 2-6, Hotel Hamilton, Chicago. Society headquarters, 1109 Hinman St., Evanston, Ill.

Institute of Metals Div., AIME—Fall meeting, Nov. 2-6, Morrison Hotel, Chicago. Institute headquarters, 29 E. 39th St., New York.

National Tool & Die Manufacturers Assn. — Annual convention, Nov. 4-8, Statler Hotel, New York. Association headquarters, 907 Public Square Bldg., Cleveland.

National Foundry Assn. — Annual meeting, Nov. 5-6, Hotel Roosevelt, New York. Association headquarters, 53 W. Jackson Blvd., Chicago 4, Ill.

Metal Treating Institute — Annual meeting, Nov. 5-7, Hotel Sheraton, Chicago. Institute headquarters, 271 North Ave., New Rochelle, N. Y.

Steel Founders' Society of America — Technical & operating conference, Nov. 9-11, Carter Hotel, Cleveland. Society headquarters, 606 Terminal Tower, Cleveland.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 9-13, Traymore Hotel, Atlantic City, N. J. Association headquarters, 155 E. 44th St., New York 17.

National Assn. of Waste Material Dealers, Inc.—National fall meeting, Nov. 11-15, Diplomat Hotel, Hollywood Beach, Fla. Association headquarters, 271 Madison Ave., New York 16.

National Screw Machine Products Assn. — Annual fall membership meeting, Nov. 15-19, Americana Hotel, Bal Harbour, Fla. Association headquarters, 2860 E. 130th St., Cleveland.

68,000,000 cars on the road

. . . a tribute to versatile steel

More cars travel American highways than those of the rest of the world combined.

Hearts, sinews, and backbones of these cars and trucks were made from some 130,000,000 tons of rugged steel—a substantial chunk of it furnished by Bethlehem. Steel, and steel alone, combines the strength, the ductility and the versatility necessary in so many automotive products.

BETHLEHEM STEEL

Steel

is strong, ductile, versatile

BETHLEHEM STEEL

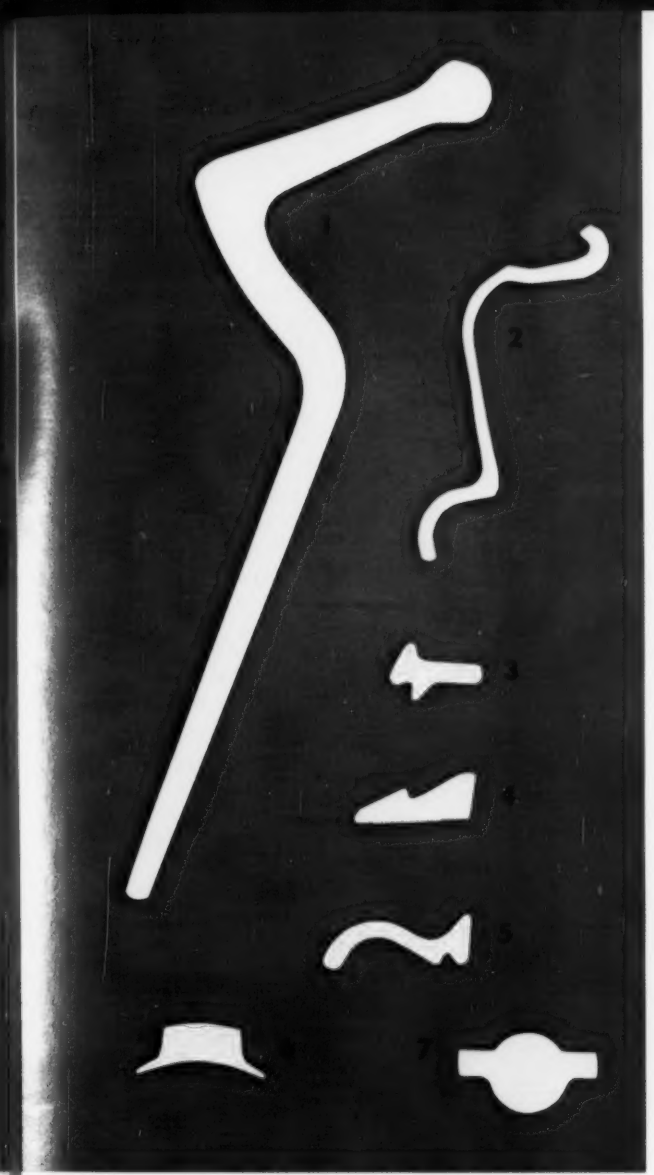
Sheet steel literally flows to make fenders, frames, panels

Rigid and tough as sheet steel is, it is amazingly plastic. Between the dies of a press, it literally flows. Fenders, bumpers, decks, frames conform precisely to the designer's dream. One giant punch, and a one-piece roof panel emerges.

Thousands of tons of Bethlehem hot-rolled and cold-rolled sheets go into parts, components and subassemblies of American automobiles. Only top-quality sheet steel turns in consistently good performances in such demanding applications.

If you work with sheets—whether in deep drawing or simple bending—you can count on Bethlehem sheets to meet your most exacting requirements.

BETHLEHEM ENGINEERS WILL HELP YOU WITH YOUR

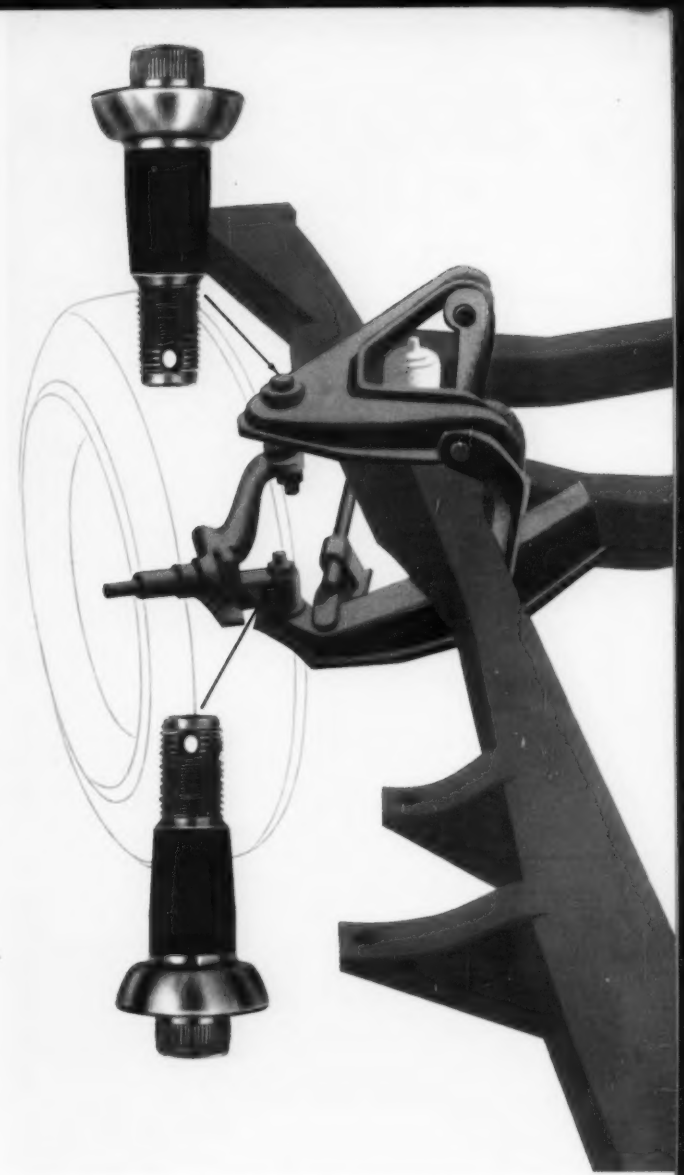


Hot-rolled from Bethlehem carbon bars for specific automotive use, these sections are: 1) gooseneck hinge; 2) tire rim; 3) tire lock ring; 4) door latch; 5) tire side ring; 6) pole piece; 7) trunnion bearing.

Bethlehem steel bars hot-rolled to your section

Above are just a few of the special sections which we hot-roll to dimensions for automotive parts. Bethlehem can roll an almost unlimited variety of special sections for a wide range of finished parts.

When you use special sections, you're putting strength right where you need it. And you get rid of excess metal and scrap loss. Net result: substantial savings for your operation, and often a better product. Bethlehem engineers will be glad to discuss special bar sections with you.



Theoretical example shows how ball stud, cold-headed from Bethlehem wire, fits into a typical ball-joint suspension system. Bethlehem sheets are widely used to form frame members and other vital parts.

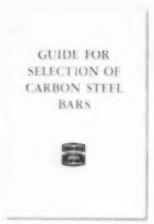
This ball-joint stud cold-formed from Bethlehem wire

Here is a ball-joint suspension part, cold-formed from Bethlehem alloy cold-heading wire. Although some finish-machining is required to meet the hair-line tolerances, the cold-heading, knurling and threading virtually eliminate scrap loss and speed up production. And, of course, cold-working produces a stronger finished part.

Even more complex parts than this can often be cold-headed with spectacular savings. Heading-quality wire, custom-made for the job, has long been a Bethlehem specialty. Let one of our engineers help you investigate the possibilities of cold-heading wire for your products.

BETHLEHEM STEEL

STEEL-WORKING PROBLEMS



Would one of these Bethlehem publications help you?

Booklet 415-C, "Quick Facts about Alloy Steels"

Catalog 436, "Bethlehem Industrial Fasteners"

Booklet 366, "Guide for the Selection of Carbon Steel Bars"

Folder 615, "Bethanized Wire"

Catalog 466, "Bethlehem Steel Plates"

Handbook 393-B, "Tubular Products"

Descr. Sheet 208, "Air-4 – Our New Free-Machining Tool Steel"

Catalog 464, "Bethlehem Crane Rails"

Steel

is strong, ductile, versatile... AND BETHLEHEM MAKES IT IN NEARLY EVERY FORM

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded carbon and alloy steels
Special rolled sections

TOOL STEELS:
A grade for every job

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged special sections

SHEETS:
Hot- and cold-rolled
Continuously galvanized

TIN MILL PRODUCTS:
Electrolytic and hot-dip tin plate; black plate

PLATES:
Universal and sheared

WIRE ROPE AND SLINGS

FASTENERS:
Standard bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous buttweld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

RAILS:
Tee, crane, girder

CASTINGS:
Carbon, alloy and stainless steel
Grey iron; brass and bronze

M 8

Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

*Please send me booklet or catalog numbers*_____

_____

Also send literature available describing these products:

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Name_____

Company_____

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599, Printed in U. S. A.

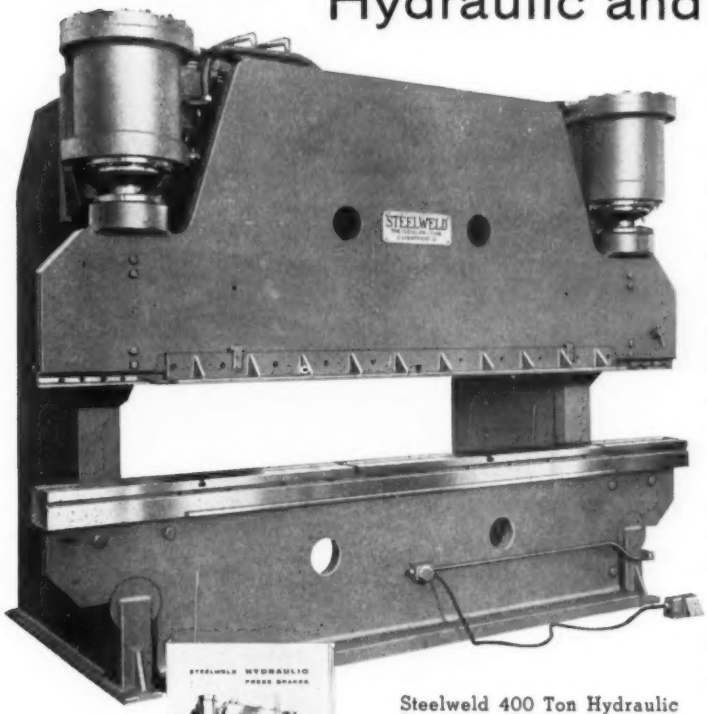
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

STEELWELD PRESS BRAKES

Hydraulic and Mechanical



Steelweld 400 Ton Hydraulic Press Brake. Bed and ram length 14'-0".

Hydraulic Press Brakes
Catalog No. 2024

Mechanical Press Brakes
Catalog No. 2023

WHATEVER your requirements, there is a Steelweld Press Brake—hydraulic or mechanical—to best serve your needs. Available in all sizes to 2000 tons. For plate thicknesses to 2". For lengths to 30'-0".

Each type of machine, mechanical or hydraulic, has its particular advantages. The work to be performed is the determining factor for most satisfactory machine selection.

As a manufacturer of both types of press brakes, we are in a position to offer you either one without partiality. Therefore, we urge you to get the complete story, the Steelweld story, when considering the purchase of a new brake. Ask for free catalogs.

Steelweld 320 Ton Mechanical Press Brake. Bed and ram length 12'-2".

STEELWELD
Mechanical and Hydraulic
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

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NITROGEN
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HYDROGEN
CARBON DIOXIDE
HELIUM
XENON
KRYPTON
NEON

1. HIGH S-W RATIO. One of the most efficient of modern structural forms is the lightweight honeycomb assembly—dubbed the sandwich panel. Typical is this one, designed for the supersonic B-58, and providing the strength of solid steel at less than half the weight. Here's how it's made—

PART OF THE PICTURE

when Twigg makes the remarkable sandwich panel . . .

AIRCO INDUSTRIAL GAS SERVICE

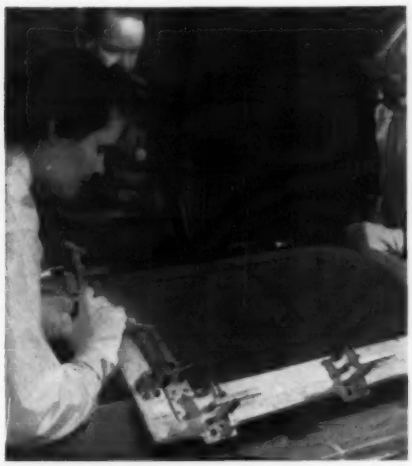
2. "FOILED" FOR SUCCESS. Twigg Industries produce the sandwich panel for Convair. It calls for the most modern, most skillfully applied brazing technique.

Over each face of this stainless steel honeycomb "core" technicians lay a paper-thin sheet of brazing alloy. And here Airco is part of the picture—as supplier of this vital silver-copper-lithium "foil," which must produce uniform, high-strength joints resistant to corrosion and extreme operating temperatures.

Next come the panel's stainless steel skin sheets.

3. IN THE BAG. Now chemically clean core, foil, skins, edge members and slugs are assembled and spot-tacked. Components pre-joined, the panel is weld-sealed within an airtight stainless steel bag.

At the purging station Airco again is part of the picture, supplying argon to replace the air in the bag.



4. BRAZED IN ARGON. Entire unit, now placed in a stainless steel retort in a furnace, is brazed for about 5 to 8 minutes at 1665°F. The atmospheres within both retort and envelope are purged continuously to maintain an environment of 100% Airco argon.

After the brazing cycle, the panel is chilled to −100°F with CO_2, reheated and X-rayed to make certain that fillets are completed and sound—an important step in the final checkout.

5. EVER-READY SUPPLY. From these Airco bulk trailers, argon and hydrogen are streamed directly into the Twigg brazing processes at Martinsville, Indiana.

More and more, the bulk trailers of Airco are part of today's industrial picture: they represent an economical way to assure an ever-ready supply of needed industrial gases.

Manufacturers in aircraft and missiles, steel, electronics, chemicals, food processing and many other industries rely on Airco for dependable supplies of high purity industrial gases.

Airco also supplies welding and cutting equipment and electrodes, and renders technical service covering all phases of gas and gas equipment applications.

Would you like to explore ways in which modern gas applications could improve your operation? Do you need a special grade of gas? Do you know how economical a permanent gas installation can be?

Call in your nearby Airco Engineering Service Representative. Airco backs him with unexcelled facilities.

AIRCO®

AIR REDUCTION SALES COMPANY

A Division of Air Reduction Company, Incorporated

150 East 42nd Street, New York 17, N. Y.

Offices and dealers in most principal cities • On the west coast—Air Reduction Pacific Company • Internationally—Airco Company International • In Cuba—Cuban Air Products Corporation • In Canada—Air Reduction Canada Limited • All divisions or subsidiaries of Air Reduction Company, Inc.

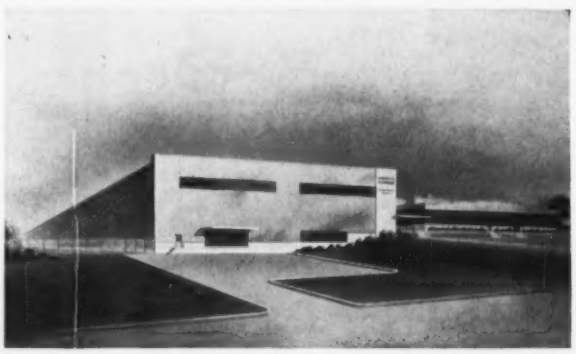
AT THE FRONTIERS OF PROGRESS YOU'LL FIND AN AIR REDUCTION PRODUCT • Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO**—industrial gases, welding and cutting equipment • **AIRCO CHEMICAL**—vinyl acetate monomer, vinyl stearate, methyl butynol, methyl pentynol, and other acetylenic chemicals • **PURECO**—carbon dioxide—gaseous, welding grade CO_2, liquid, solid ("DRY-ICE") • **OHIO**—medical gases and hospital equipment • **NATIONAL CARBIDE**—pipeline acetylene and calcium carbide • **COLTON**—polyvinyl acetate, alcohols, and other synthetic resins.

GOLD-CLAD STAINLESS TUBING CURBS CORROSION IN REACTOR

Photo pictures insertion of gold-clad stainless steel heat exchanger into gold-clad power reactor at AEC's Los Alamos Scientific Laboratory. Completely successful in recent operational tests, the unique reactor is designed to produce superheated steam in a single pass. This is the second experimental reactor using uranyl phosphate fuel—the first unit failed because of excessive corrosion in the heat exchanger. Gold-cladding now protects all structural parts in contact with the extremely corrosive solution.

Will clad metals solve *your* corrosion problems? Investigate the BISHOP line of clad metals. BISHOP was the first company to successfully produce gold-clad stainless tubing . . . coupon brings data. Use it.

NEW BISHOP TUBE MILL OPENS



Sketch shows new BISHOP facilities adjacent to the present tube mill in East Whiteland Township, west of Paoli, Penna.—completing the first stage in BISHOP's long range expansion program. This two-story structure will contain over 165,000 square feet of floor space. BISHOP platinum mechanical manufacturing operations also move to the East Whiteland plant.

BISHOP NOW DRAWING .002" WALL TANTALUM TUBING

Tantalum tubing with paper-thin wall thicknesses is now being supplied by BISHOP on special order. Sizes range from .062 in. OD x .002 in. wall to 1.5 in. OD x .125 in. wall. Columbium (niobium) tubing down to .002 in. wall has been produced and is also available. Can tubing of these "exotic" metals be the answer to any of your design problems? Check with BISHOP . . . use the coupon.

J. BISHOP & CO.

platinum works

FOR HELPFUL DATA USE THIS HANDY COUPON

- ☐ Tubular Products Bulletin No. 12
- ☐ Platinum Products Catalog No. 4
- ☐ Clad Metal Data
- ☐ Special Tubing Data

Check information you'd like and mail to
J. BISHOP & CO.,
35 King St., Malvern, Penna.

Name

Position

Company

Address

City Zone State

Tubular Products Division

35 KING STREET, MALVERN, PENNA.

NIagara 4-3100

THIS IS THE BISHOP LINE:
Products of all the Platinum Metals... Small diameter Stainless Steel, nickel and special alloy tubing

Now you can add the "Touch of Gold" . . . with the new Norton centerless grinder

The ability to produce better products at lower cost is an *extra* built into every Norton grinding machine.

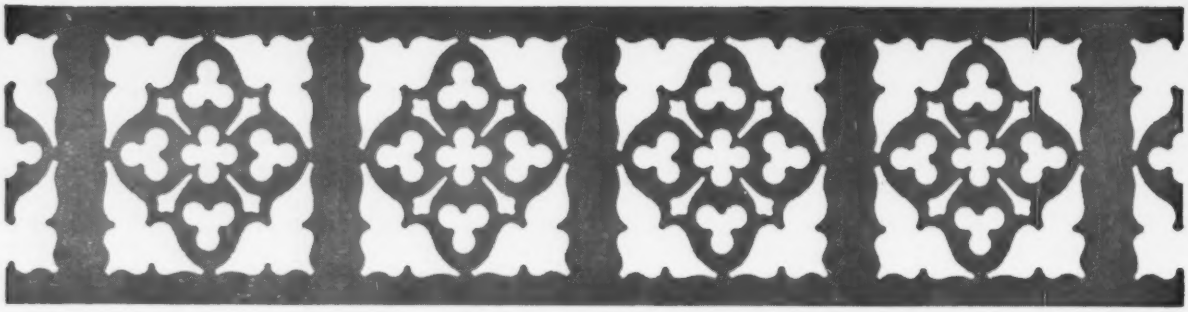
Now, for the first time, this "Touch of Gold" performance is available in a centerless grinder. The new Norton No. 2 Centerless Grinder, the latest addition to the world's largest line of grinders and lappers, is ready for immediate delivery.

How this sensational new grinder can help you get a new start against competition is worth knowing. Get the whole story from your Norton Man, soon. NORTON COMPANY, Machine Division, Worcester 6, Mass.

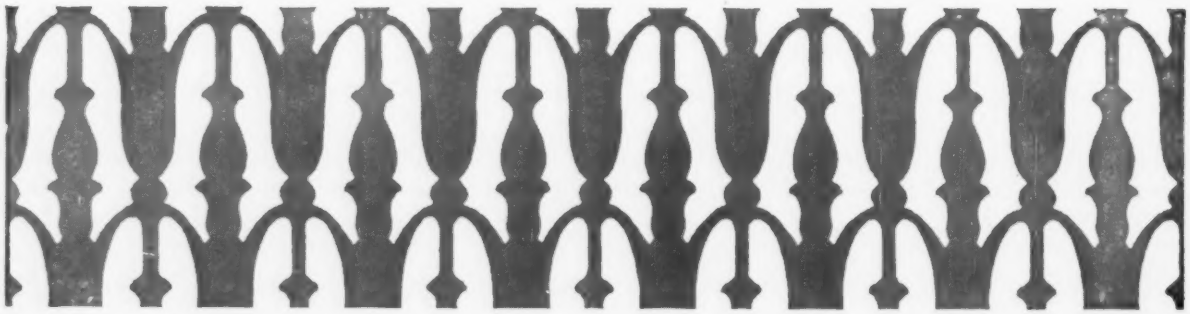
NORTON
GRINDERS and LAPPERS

Making better products . . . to make your products better

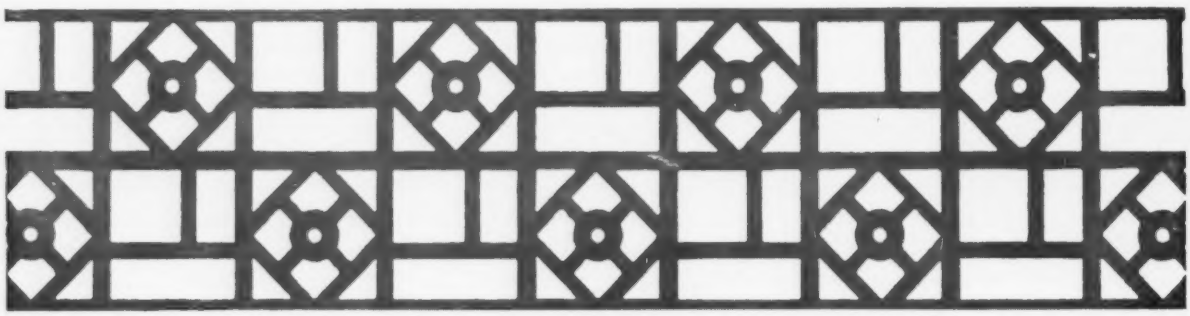
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



make your design



shine with Hendrick



perforated metal

You may find just the perforated metal to top off your design when you look over the patterns that are exclusively made by Hendrick. These patented patterns are an important part of the Hendrick catalog, which contains more than 100 exclusive designs in all.

Hendrick Perforated Metal is furnished in every available commercially rolled metal. All can be supplied with varying numbers and sizes of perforations, in plain or panel effects.

All combine the functional and the decorative with low cost.

Write for free Catalog from Hendrick . . . the pioneer in perforated metals. This catalog can show you dozens of ways to make *your* design shine.

HENDRICK

MANUFACTURING COMPANY *37 Dundaff Street, Carbondale, Pa.*

PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS • HENDRICK WEDGE WIRE SCREENS • ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING—SHUR-SITE TREADS • ARMORGRIDS • HYDRO DEHAZERS • DISTILLATION COLUMN INTERNALS

Change hats
with your maintenance man . . .

You'll find out . . .

Vertical Lift Magne-blast Breakers have low center of gravity, won't tip over

Find a moment soon to ask the man who maintains your metal-clad switchgear which power circuit breakers are easiest to handle.

He'll tell you he prefers General Electric Vertical Lift Magne-blast Breakers because they have a low center of gravity, aren't awkward and difficult to draw out. Vertical lift Breakers are nearly impossible to tip over, reducing the possibility of breaker damage, injury to personnel and disruption of production. General Electric Company, Schenectady 5, New York. 511-33

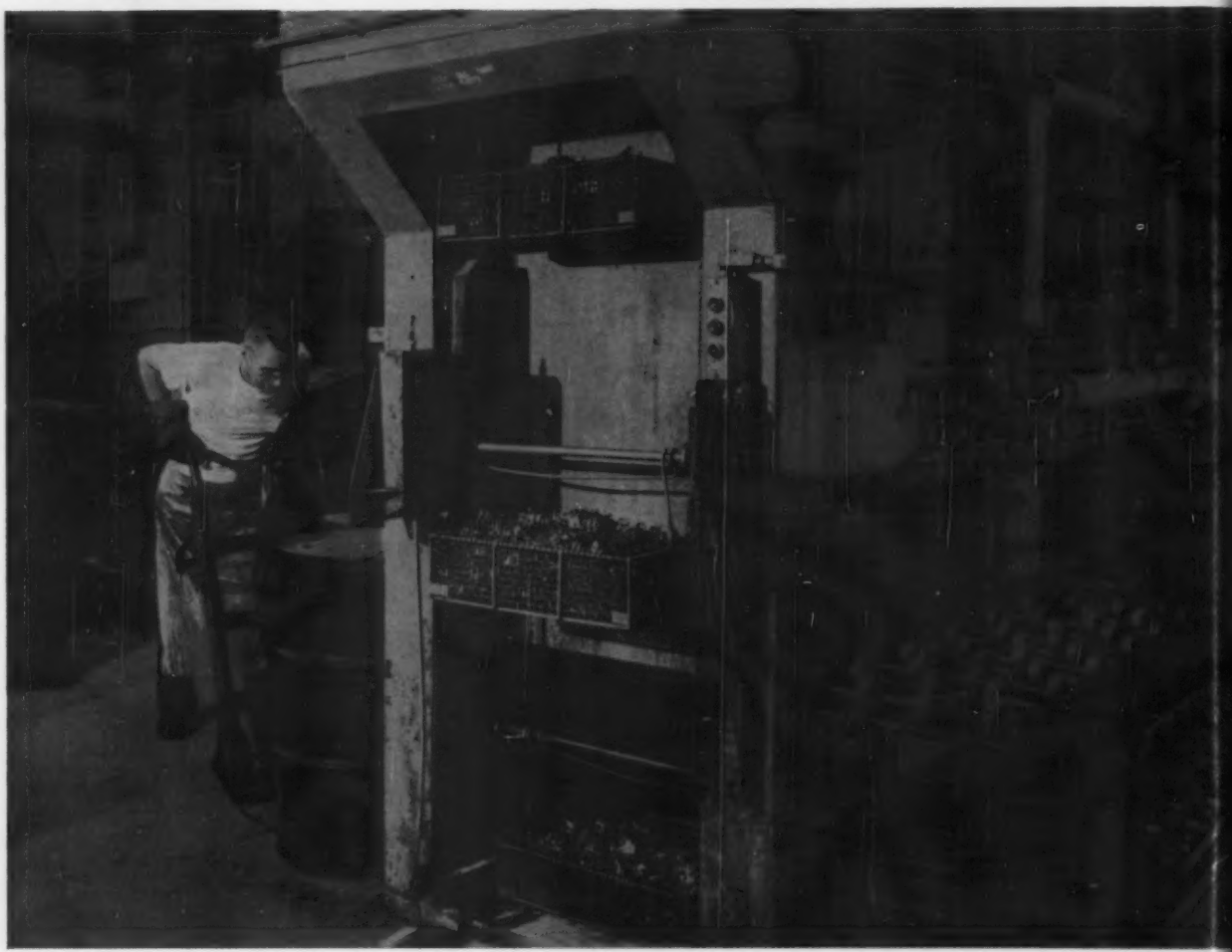
Progress Is Our Most Important Product

GENERAL ELECTRIC

DOW

metal cleaning report no. 3

Suggested uses and case histories from your distributor of Dow solvents.



ELECTRONIC PARTS . . .

"CASE OF THE UNSEEN FILM" SOLVED

The difference between clean and not-quite-clean metal can mean the difference between high performance and no performance in electronic equipment. One maker of electronic components had a run of certain units which performed poorly. His distributor of Dow solvents helped trace the trouble down to invisible residue remaining on contact surfaces after degreasing operations. On the distributor's recommendation, the cleaning solvent was changed to NEU-TRI® (Dow's neutral stabilized grade of trichloroethylene). Troublesome residue vanished . . . so did the problem!

AUTOMOTIVE EQUIPMENT

New solvent adds clean profit—This manufacturer of automotive equipment was searching for ways to increase production and to cut per-unit costs. When he changed to NEU-TRI for vapor degreasing, he got completely cleaned parts faster . . . and more parts per hour off the line.

PRECISION BALLS AND BEARINGS

No place for "half-clean"—A producer of components for rockets, missiles and atomic piles depends on Chlorothene® to clean precision balls and bearings, using ultrasonic equipment. The solvent's major advantages in this case are greater safety and exceptional cleaning power.

FORGED PARTS

Resin's gone with the rinse—Removing stop-off resin from forged parts after plating operations can be a real problem! This tool manufacturer found it so before he standardized on fast-acting Dow methylene chloride, suggested by his distributor of Dow solvents. Now a quick dip, and a rinse in methylene chloride brings parts to assembly stage completely resin-free.

LIGHT GAUGE ALUMINUM

Large problem gets cold solution—Product too large for vapor degreasing? Then cold-dip it with Chlorothene (Dow 1,1,1-trichloroethane, inhibited). That's what this producer of aluminum storm doors, windows and screens did. And he found the high solvency of Chlorothene removed all contaminants thoroughly, permitting sound welds without pits or inclusions.

Double Value, Double Help—when you put Dow metal cleaning solvents to work in your plant. You get twin benefits because: (1) Dow offers the widest line of chlorinated solvents for modern industry (each designed for specific purposes); (2) your distributor of Dow solvents is ready, and fully qualified, to give you technical help when you need it. And he's backed by the knowledge and experience of Dow chemists and solvents specialists.

There's probably a spot in your operations that could benefit from the use of one of the many Dow industrial solvents. Or perhaps you've a problem in metal cleaning. In either case, your nearby distributor of Dow solvents is the man to call.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

FREE . . .
TECHNICAL SERVICE
on 24-hour-notice

Your distributor of Dow solvents will gladly help you with any problems you're experiencing with metal cleaning solvents. He'll have a trained solvents specialist en route to your plant within 24 hours after your call is received.

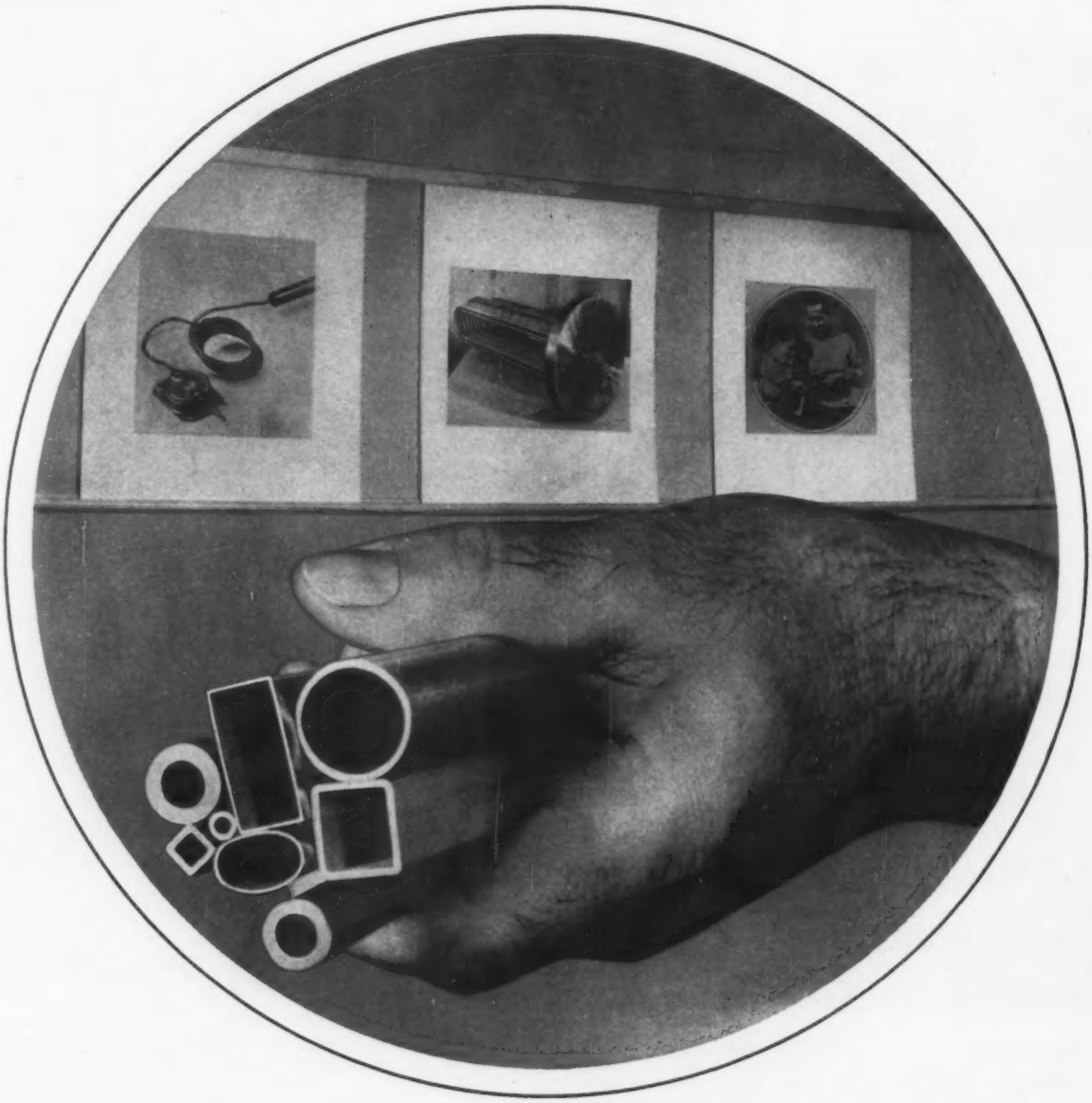
Ask your distributor of Dow solvents for details.

CHLOROTHENE®
TRICHLOROETHYLENE
PERCHLOROETHYLENE
METHYLENE CHLORIDE

See Your Distributor of Dow Solvents First!

Tubexperience in action

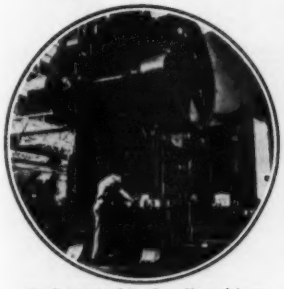
What are your tubing requirements?



Do you know that tubing can be formed into many unusual shapes? That it can cut the costs of many parts formerly machined from bar stock? That you can get it in many standard analyses or special ones with unique physical and mechanical properties? That no matter what the shape, the physical characteristics, the mechanical properties, the type of application—Superior can supply your needs? Superior is the world's largest producer of small-diameter tubing. More than 120 analyses are offered, including many types of stainless, carbon and alloy steels, nickel and nickel alloys, beryllium copper, titanium, zirconium and super alloys.

Typical of the scope of Superior tubing are those listed on facing page—carbon hydraulic tubing, stainless and carbon mechanical tubing, leaded steel tubing with excellent machining and forming characteristics, pressure and super pressure tubing, tool steel tubing, and many other types to fit most requirements. For assistance in the selection and application of Superior tubing, write for the name of your nearest Steel Service Center stocking this product and a copy of Bulletin 41. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

• SPECIAL SHAPES • COSTS • UNUSUAL PHYSICAL CHARACTERISTICS • UNIQUE MECHANICAL PROPERTIES



Carbon steel hydraulic tubing

FOR HYDRAULIC AND PNEUMATIC LINES:

Superior (SAE) Carbon Steel Hydraulic Tubing. Made from nonaging steel with high ductility properties in sizes from ⅛ in. through 1⅛ in. 100% hydrostatic pressure and flare tested. OD and ID surfaces are smooth, bright, uniform and protected with a special rust preventive. Recommended for pressures up to 3000 psi.

FOR HIGH PRESSURE APPLICATIONS:

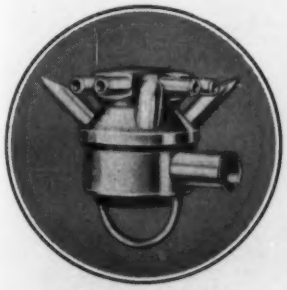
Super Pressure Tubing. Single wall for pressures ranging from 15,000 to 30,000 psi. Available in ODs from .125 to .750 in. Made from Types 304, 316, 321 and 347 and in AISI Type 4130 alloy steel. Composite wall for pressures as high as 100,000 psi. Recommended combinations are low carbon steels and stainless steels, nickel base alloys and stainless steels.

Super pressure tubing

FOR MANY MECHANICAL APPLICATIONS:

Seamless Carbon Steel Tubing. 11 standard and 3 special grades for an endless number of applications. Stocked by Steel Service Centers in a broad range of sizes with diverse mechanical and physical properties.

Seamless & WELDRAWN® Stainless Tubing. Type 303, for use where a free cutting material is required; offers high resistance to corrosion; assures good end-product surface. Also many other analyses.



Stainless steel tubing

Leaded Carbon Steel Tubing. Has built-in lubrication to permit faster speeds, heavier feeds. Will often reduce costs by requiring fewer finishing operations. Available in a range of ODs from .012 through 1⅛ in. in Leaded 1020.

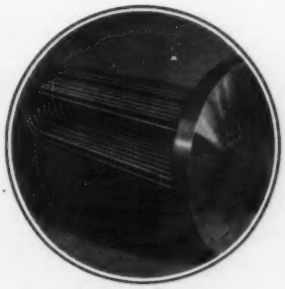
Alloy Steel Tubing. In a number of different analyses. Designed for production of such parts as thread guides, races, gear and pinion parts, mandrels, etc.

Tool steel tubing

Tool Steels. Produced from MT-1095 high-carbon steel and E-52100 alloy steel. Both grades have excellent strength, hardness and wear resistance. Both can be oil hardened to improve toughness and abrasion resistance. Available in sizes from .012 through ⅜ in. OD.

FOR HIGH TEMPERATURES REQUIRING HIGH STRENGTH, GOOD OXIDATION AND CORROSION RESISTANCE:

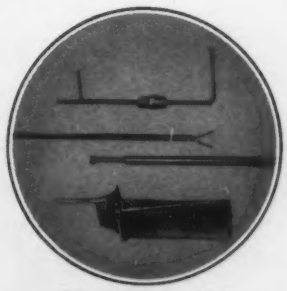
Super Alloy Tubing: Analyses include Types 316, A-286, 19-9DL, 16-25-6, Croloy 15-15N, Inconel X, Nichrome V, Hastelloy X, Hastelloy F, Waspalloy, Haynes 25 and N-155. Has a minimum stress rupture strength of 25,000 psi at 1000 hr. and 1200 F. Resists progressive scaling and other types of corrosion. Will not fail through brittle fracture or show excessive grain growth at operating temperature.



Heat exchanger tubing

FOR HEAT TRANSFER EQUIPMENT:

Heat Exchanger Tubing. Made from MT-1010, 502, 304, 304L, 316, 347, 348. Strict adherence to the highest commercial and military combined specifications. Quality controlled with uniform wall and extra close tolerances. Precise surface inspection. 100% flare and pressure tested. Excellent brazing and welding qualities.



Thermocouple tubing

FOR ELECTRICAL, ELECTRONIC AND SPECIAL APPLICATIONS REQUIRING GOOD CORROSION RESISTANCE:

Nickel Alloys: Analyses include Low Carbon Nickel, A Nickel, D Nickel, DURANickel, Monel, Inconel, Ni-Span C, Nionel, Nimonic, Hastelloy, Haynes 25, Permalloy, Chromel P, Alumel, Nichrome V and Invar. Many sizes, shapes and tempers. Excellent corrosion resistance, high strength and workability.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

Our name is NEW!

AJAX M

AGNETHERMIC

but... **We Are the**
Pioneer Company **in**
Induction Heating Equipment

New in name but rich in tradition and experience . . . that's Ajax Magnethermic. The men who did much of the original pioneering work in induction heating—Northrup, Wyatt, Clamer—founded or were associated with the companies who joined together this year to form Ajax Magnethermic Corporation.

This new name combines three old names in the business—Ajax Engineering Division, pioneers in 60 cycle melting; Ajax Electrothermic Division, pioneers in high-frequency melting; and Magnethermic Division, pioneers in induction billet heating.

This old, "new" company now offers the most complete line of induction heating equipment, the most experienced staff, and largest facilities of any company in the business. When you have a heating or melting application and want guidance and unbiased recommendations, consult Ajax Magnethermic. Our only business is the design, engineering and manufacturing of induction heating equipment for heating and melting.

John A. Logan
PRESIDENT

Induction Heating is our ONLY Business

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Sales Offices

Atlanta, Chicago, Cincinnati, Cleveland, Denver, Detroit, Erie, Houston, Los Angeles, Nashville, New Haven, Philadelphia, Seattle . . . Ajax—Ontario, Canada; Dusseldorf, Germany

This Standard Oil product made better grinding possible at Cessna

Aircraft Company's Industrial Products Division licked three problems with ARGON Oil No. 4

Jerry Croes, Standard Oil staff engineer, Paul Hoyer, Cessna section superintendent and Bill Ray, Standard Oil lubrication specialist (l. to r.) inspect rust-free finish after grinding with ARGON Oil No. 4 while J. E. Petrie (far left), operator, looks on. Both Jerry Croes and Bill Ray have plenty of experience in this sort of work, Jerry has been at it for 16 years. He has an engineering degree from South Dakota School of Mines & Technology and has completed the Standard Oil Sales Engineering School. Bill has six years service working with Standard Oil customers.

Situation: A fluid used in grinding operations at this Cessna plant at Hutchinson, Kansas, was creating three problems:

1) It washed the lubricant from regulator wheels and grinding fixtures, causing them to freeze.
2) It caused build-up of deposits.
3) It stripped paint from machine surfaces.

What was done: Cessna management called in a Standard Oil lubrication specialist who recommended ARGON Oil No. 4 in ratios of 100 and 150:1 for test. The coolant was tested in two centerless grinders for two months.

What happened: All three conditions which were hampering operations were cleared up when the switch was made to ARGON Oil No. 4. Cessna also found that work remained rust-free after passing through the machines, something that had not been the case before. They also found that the coolant didn't foam. With no foam, more of it stayed on the wheel, resulting in cooler operation. Faster cuts were obtained with finer wheels. All 12 grinders in the Cessna shop were then converted to ARGON Oil No. 4.

What you can do: Get more facts about ARGON Oil No. 4 from the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Illinois.**

Quick facts about **ARGON Oil No. 4**

• Clear, transparent fluid • Able to control corrosion and rust on work and machines • All chemical. Does not support bacteria growth • Unaffected by humidity • Fire resistant • Odorless

You expect more from **STANDARD** *and you get it!*

Francis E. Blod specifies

Sharonart*

for the kitchen of tomorrow . . .

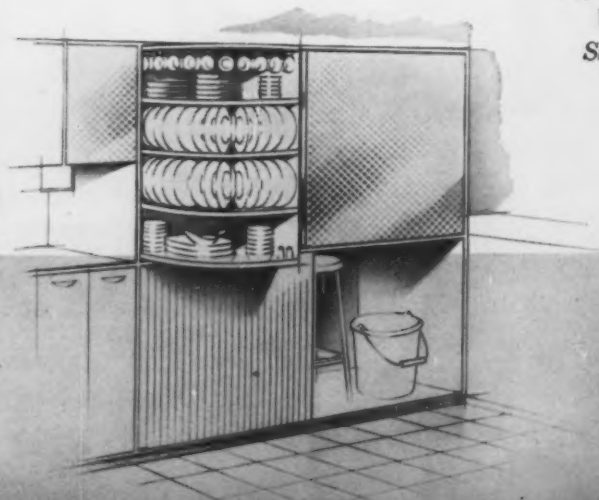
To give kitchen storage added utility and exciting style that blends with modern day kitchen appliances, nationally known industrial designer Francis Blod has taken advantage of Sharonart, to achieve the clean line, functional and highly attractive kitchen storage unit shown on these pages.*

A recipient of many national design awards, Mr. Blod is a Board Member and President Emeritus of the Package Designers Council; graduate and member of the Board of Trustees of the School of Design of Pratt Institute.

Sharonart*, Sharon's exciting new surface patterned steel, is stimulating the imaginations of leading designers everywhere.

It has all the strength, economy and forming advantages of steel, plus the mar resistance and added beauty of a textured surface. Ideal for wear areas, it permits model changing without retooling. Available in dozens of patterns, Sharonart* can be made in almost any special pattern to suit design requirements. Patterns are rolled in plain carbon steel or in stainless steel. Literature and samples available upon request from the Sharon representative in your area by writing direct to the *Sharon Steel Corporation, Sharon, Pa.*

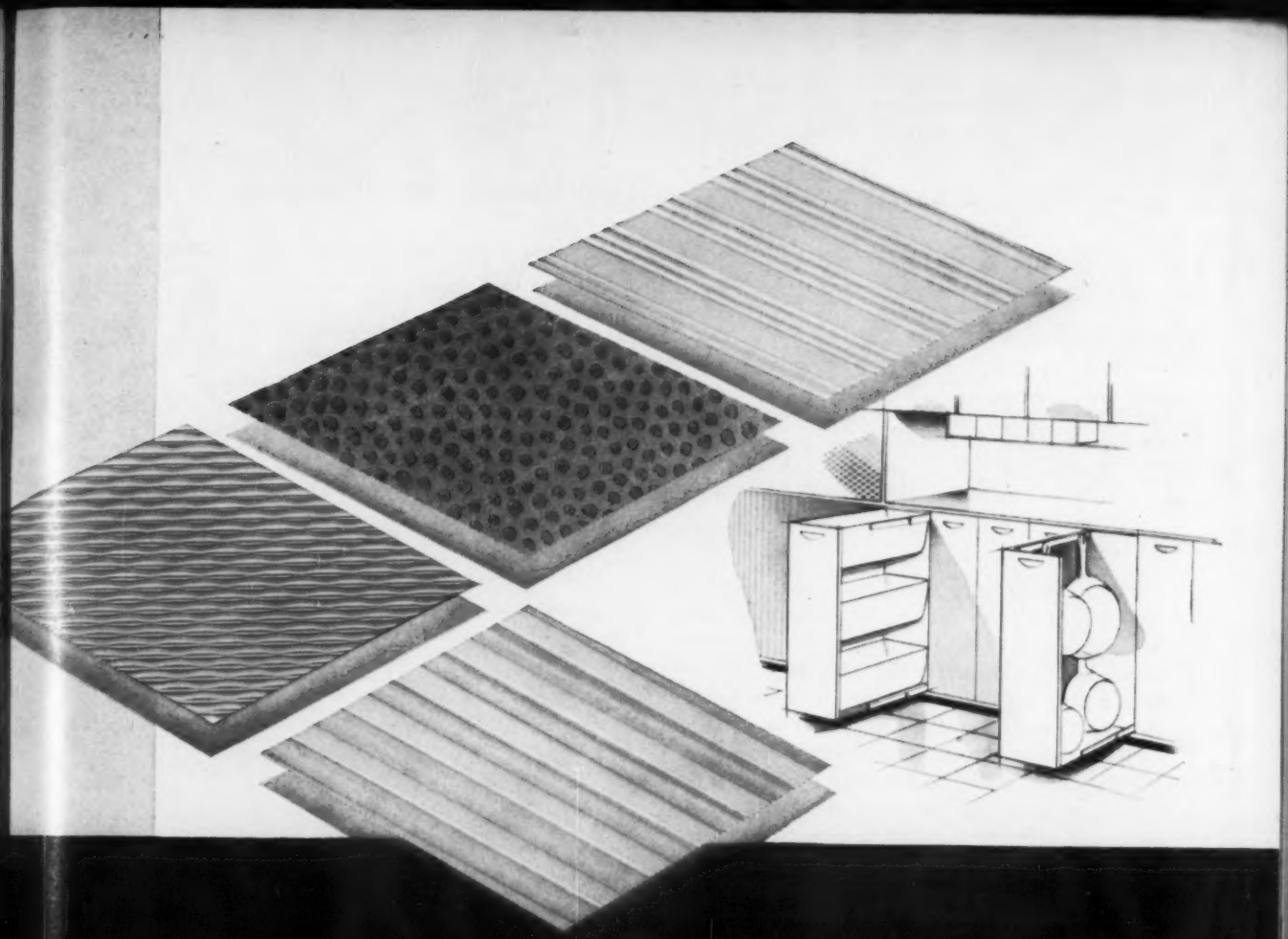
*TM



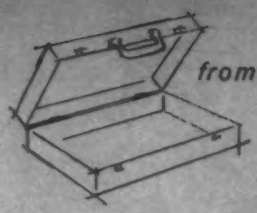
Rotating cupboard accomodates both dishes and glassware providing organization and ready access while preventing chipping. Sliding Sharonart panel utility section provides storage for outsized objects.*

Pull-out bins offer ready accessibility to staple vegetables as well as pots and pans. Protruding handles are eliminated through the use of pressure sensitive spring loaded closures and recessed pulls.

Trim look of Blod designed kitchen unit includes flatware and linen drawers and automatic Sharonart stainless steel canisters adjusted to dispense premeasured amounts of dry foods, spices, etc.*



SHARON *Quality* **STEEL** SHARONSTEEL



from the case of the A. O. Smith Motor Man . . .

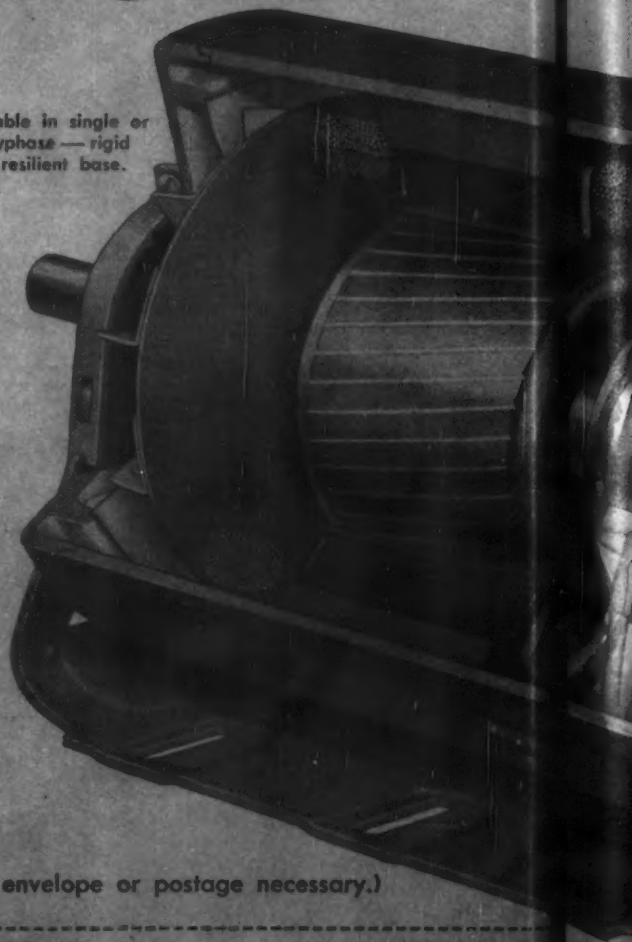
A MOTOR THAT SET INDUSTRY STANDARDS:

LOOKING AHEAD FOR NEW JOBS

Here's a motor with ambitions! Sealed-capsule fractional-hp motors — designed originally to solve the problems encountered in the air-conditioning and pumping industries. Consider their performance qualifications — you'll see why they've only scratched the surface . . . why they'd be ideal for such equipment as compressors, machine and woodworking tools, materials handling equipment, etc.

Qualifications? For one thing, sealed-capsule design (end-mounting, end-sealing of switch, actuator, thermostat and terminal board) has eliminated the biggest cause of single-phase fractional-hp motor failure. It's easy to see why these motors keep on the job under the most severe working conditions.

Unique installation flexibility has also resulted from this functional component grouping. Ball bearings and closer bearing centers assure minimum noise and shaft play . . . permit mounting anywhere in any position. Air is practically silenced through a unique ventilation design . . . magnetic noises are reduced to absolute minimum by special machining and assembly processes. Let us put one on your equipment. Compare it with sleeve-bearing motors. For complete data, please use the handy coupon below.



Available in single or polyphase — rigid or resilient base.

(Cut on dotted line, fold, staple and mail. No envelope or postage necessary.)

☐ Please send me more comprehensive details and application data on the A. O. Smith line of fractional-hp motors — 1/3 to 2 hp — that feature sealed-capsule design.

☐ I'd like to test your sealed-capsule motor.

NAME .....

FIRM .....

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Postage Will Be Paid by Addressee

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First Class Permit No. 83, Tipp City, Ohio

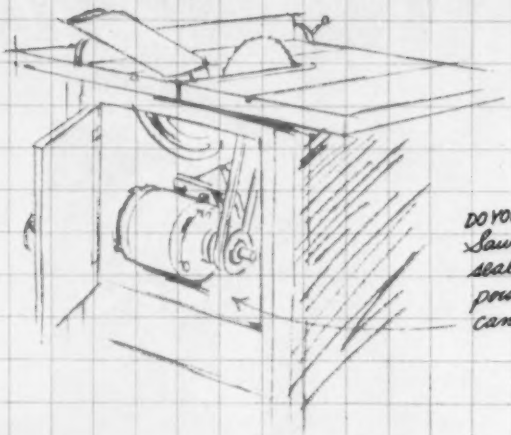
A.O.Smith CORPORATION

ELECTRIC MOTORS

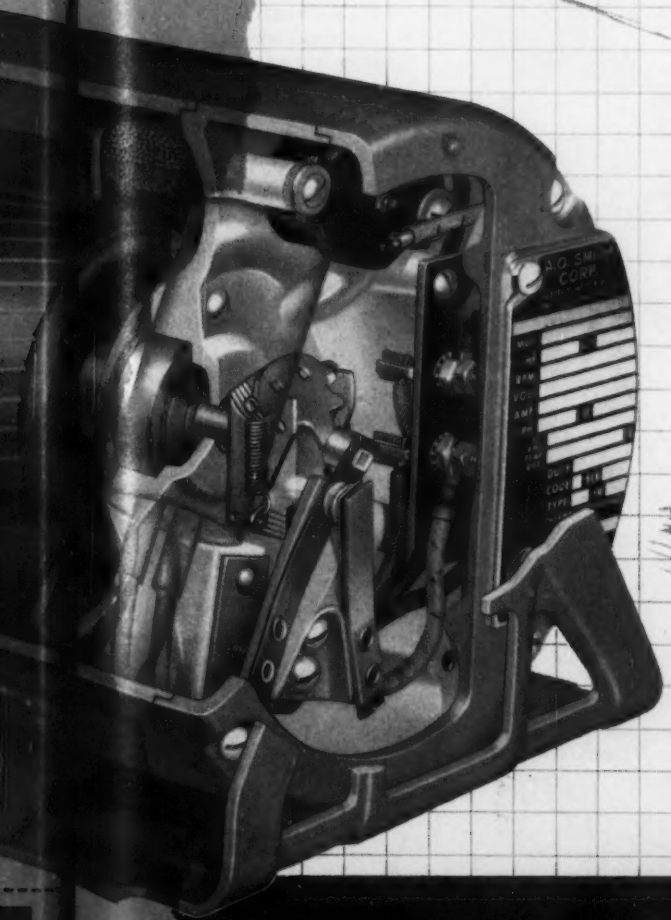
531 N. Fourth St.

Tipp City, Ohio

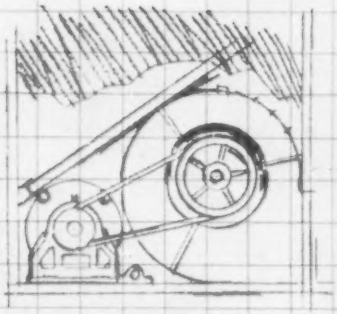
Scan the drawings below for ideas on how the sealed-capsule design can work into your plans

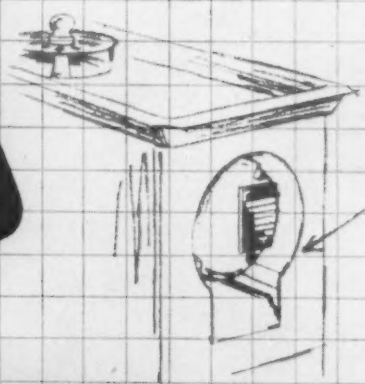


DO YOU HAVE A MOTOR CONTAMINATION PROBLEM? Sawdust and other foreign matter is sealed out of motor end-capsule on this powersaw application. Ventilating air cannot contaminate vital parts.

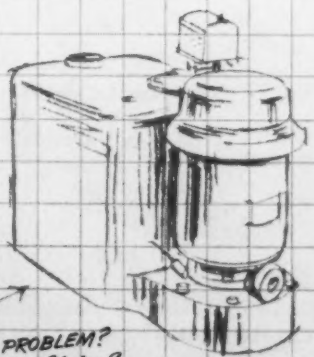


IS SPACE A PROBLEM? On this air-conditioning unit, absence of externally mounted capacitor (doghouse) permits installation in tight quarters without damage. Has eye appeal too.





IS EASE OF MAINTENANCE A PROBLEM? End-plate of sealed-capsule motor shields all functional parts . . . is easily removed for inspection in extremely limited areas as on this meat-cutting machine.



WHAT IS YOUR PROBLEM? Contamination? Noise? Maintenance? Appearance? Thrust? Space? The A.O. Smith sealed capsule motor was designed around just such "specs." Why not try it for your application?

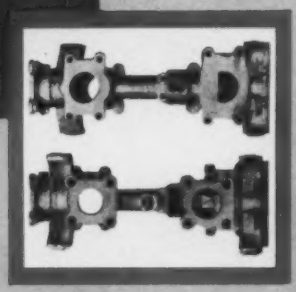
Truly functional component grouping. Switch, actuator, capacitor, thermostat, and terminal board are all conveniently end-mounted . . . all completely protected against contamination and mechanical damage.

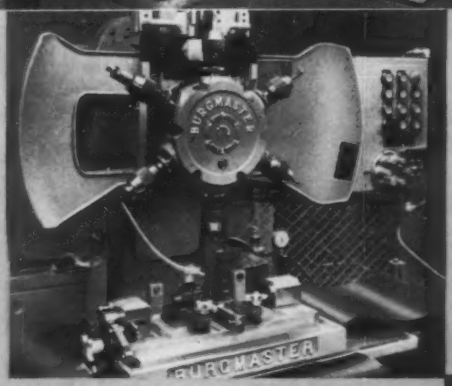
Note adjustable starting switch! On every A. O. Smith single-phase motor, switch is adjusted after assembly by turning a self-locking screw to achieve a pre-set clearance between the switch button and actuator. This assures proper contact alignment and positive switching action . . . guarantees maximum life for every motor.

Stainless Steel Valve Body

BURGMASTER *tape controlled*

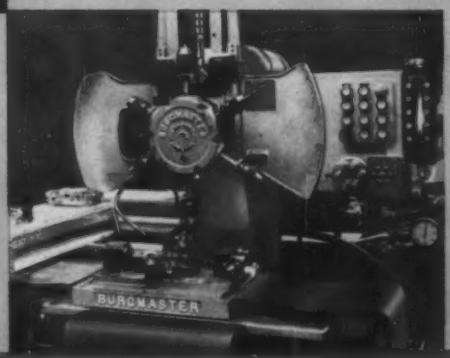
#347 Stainless Steel Valve Bodies now machined on Automatic Tape Controlled Burgmasters to far better than the required ±.002" tolerances. Former time was 2.7 hours. Present time is ½ hour.





1st operation showing the simple quick clamping fixture, and tooling required to perform 32 precision drilling and c'boring operations.

2nd operation showing simple Fixture and tooling used to perform 27 drilling and reaming operations.

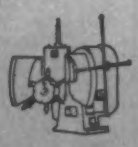


World's Largest Builder of Turret Drilling Machines

"O" Manual Power Index ¼" Capacity

1C Manual Power Index ⅜" Capacity

2B Manual Power Index ⅜" Capacity



2BF Flange Mounted Power Index ⅜" Capacity

2BH Automatic Hydraulic ⅜" Capacity

3BH Automatic Hydraulic 1½" Capacity

2BR Ram Type Radial Drill ⅜" Capacity

2BHT-3BHT Auto Tape Controlled ⅜" and 1½" Cap

Production Increased 440% with...

6 SPINDLE TURRET DRILL

(at Standard-Thomson Corp., Waltham, Mass.)

Two Burgmaster G. E. Tape Controlled 6 Spindle Turret Drilling Machines used for machining #347 Stainless Steel Valve Bodies at Standard-Thomson Corporation, Clifford Mfg. Co. Division, Waltham, Mass. have increased production 440% as compared to a multiple drilling set-up using dowel location holding fixtures. The valve jobs are now machined in 2 set-ups (one per machine) and a total of 59 operations including drilling, c'boring and reaming are automatically performed in ½ hour rather than the former time of 2.7 hours.

The machines were purchased expressly for this job although they will also be used for other work. "The repetition of controls has been perfect, and dimensions are held far beyond the required tolerance."

MAXIMUM FLEXIBLE AUTOMATION is obtained from Burgmaster 6 and 8 spindle Turret Drilling, Tapping and Boring machines because they can be quickly and economically set up to produce a large variety of parts using standard tools and simple work holding clamps.

The standard adjustable Burgmaster controls are maintained...including pre-selective spindle speeds, infinitely variable pre-selective feeds, slective rapid approach and return, skip indexing, precision depth control, and simple manual controls for set-up. The G. E. numerical system controls all machine functions, selects spindles in any sequence, automatically positions the table on two axes, clamps the table while machining operations are performed, and controls coolant. Up to 6 or 8 different operations can be performed at any command position without moving the table, or as many cycles using one tool as desired, without indexing. All operations are carried out at their most efficient rate for high finish, precision, speed, and longest tool life. As a result one man can operate two or more machines on many jobs, or by attaching two tapes together one part can be machined on one end of the table while work is being set up on the other to effect constant machine operation.

Whether your work is small lots or high production you can obtain exceptional savings and production increases with Burgmaster Tape Controlled Turret Drills. Our representatives will be glad to discuss this possibility on your work with you, at no obligation. Just call.

JOB FACTS

Machines: Two Burgmaster Tape Controlled Turret Drills.
Parts: Valve Bodies #347 Stainless Steel
Lot Size: 50
Holding Fixtures: Simple quick acting clamps
Operations: 59 — C'Drilling, Drilling, C'Boring and Reaming
Accuracy: ±.002" required
Former Time: 1st operation — 1.2 hours
2nd operation — 1.5 hours
Total: 2.7 hours
Present Time: 1st operation — .17 hours
2nd operation — .33 hours
Total: .5 hours
Savings: 2.2 hours
Production Increase: 440%
Other Advantages: Far better accuracy than required; repetition of controls has been perfect.

Write for Bulletin describing Burgmaster 6 and 8 Spindle Tape Controlled Turret Drilling, Tapping, and Boring Machines. Thirty-minute 16mm sound film showing all Burgmaster Turret Drills in operation is available from any office without charge.

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Plus dealer representatives in other industrial centers.

in the scrap yard,
in the furnaces,
on the finishing line

LINDE Oxygen is at work for Lukens Steel Company

Cutting metal to charging size, speeding steel making, scarfing hot slabs–from beginning to end of the steel making process LINDE Oxygen is busy at Lukens Steel Company . . . and has been for twenty-six years.

Lukens' just-completed "Phase A" Expansion calls for even busier oxygen. More scrap to cut, more furnaces to feed, more slabs to scarf–as production increases, the use of oxygen grows.

To keep pace with a growing Lukens Steel, a new LINDE on-site plant is now on stream at Coatesville, Pa. Capacity: 80,000,000 cubic feet per month.

LINDE Oxygen is no stranger at Lukens Steel. It's been at work there since 1933. In this quarter-century their oxygen requirements have grown from 100,000 cubic feet to present capacity.

Every step of the way—from start to 1,500,000; then to 20,000,000 cubic feet; and now to 80,000,000—LINDE has supplied Lukens Steel with the exact amount of oxygen they needed, when they needed it.

If you would like more information on how LINDE Oxygen and supply systems can help you, write: Dept. I-104, Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, New York. In Canada: Linde Company, Division of Union Carbide Canada Limited, Toronto.

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outstanding instrument designers in the Ultrasonic Industry

ULTRASONIC THICKNESS GAGE

New, battery operated, completely transistorized, thickness gage.
Using pulse echo method, detects changes in metal thickness even in corroded or rough surfaces.
Small (7″ x 7″ x 10″), lightweight (10 lbs.).
Easy to read meter, directly calibrated in inches.
Particularly useful in inspection of high pressure pipe, storage vessels and ship hulls for thinning and corrosion.

UM ULTRASONIC REFLECTOSCOPE

New Unitized Ultrasonic Reflectoscope provides maximum flexibility through low cost interchangeable plug-in units.
Designed to accommodate various components, choice of frequency ranges, alarm and recording channels, attenuation correction, counting and totalizing channels, etc.
Economical building block method permits adding to instrumentation to meet increasing or changing testing requirements.

UI ULTRASONIC REFLECTOSCOPE

Latest concept in ultrasonic testing equipment.
The most advanced instrument for lab and production line testing, compact for use on bridge or bench.
Exclusive features: Four instantaneous or continuous alarm channels with separate channel indication.
Plug-in receivers with frequency ranges from 1 to 25 mcs.
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Double slope curves for distance amplitude correction—both near-zone and attenuation.

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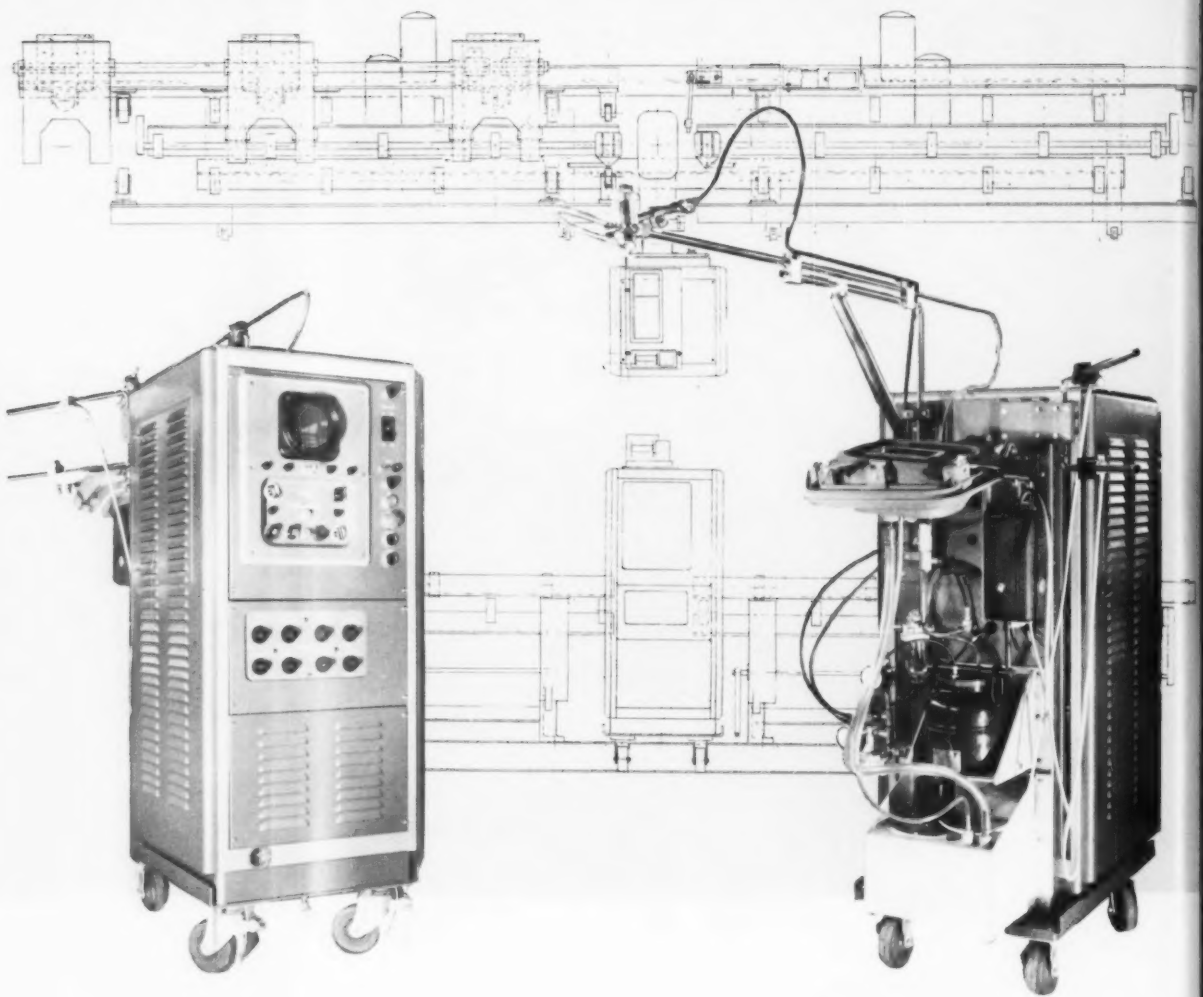

AUTOMATIC ULTRASONIC TESTING SYSTEMS

FOR PRODUCTION QUALITY CONTROL

Sperry now makes available automatic production testing on an economical packaged basis.

These systems are designed to test billets, bar stock, sheet, plate, tubing, etc. at production speeds. Consisting of the necessary instrumentation, scanning equipment, recorder, alarms, and defect markers, as well as material handling equipment, the packages are truly complete testing systems.

For the complete story, check off and mail attached reply card to arrange a visit by a Sperry sales engineer.

Sperry Products, Inc.

Danbury, Connecticut

Who Buys Roebling Upholstery Spring Wire After You Do?

The end-user can hardly be expected to know a great deal about Roebling helical spring wire, border and brace wire, zigzag and no-sag wire, wire for automatic machines, lacing wire...

Thus, the qualities of uniformity, temper, tensile strength, size and finish that are yours whenever you use Roebling Spring Wire mean long life, resiliency under constant use (and abuse) where it counts the most...to those who buy Roebling Upholstery Spring Wire after you do.

For further information on the wide range of types, the consistent superiority and availability of these and other Roebling wire products, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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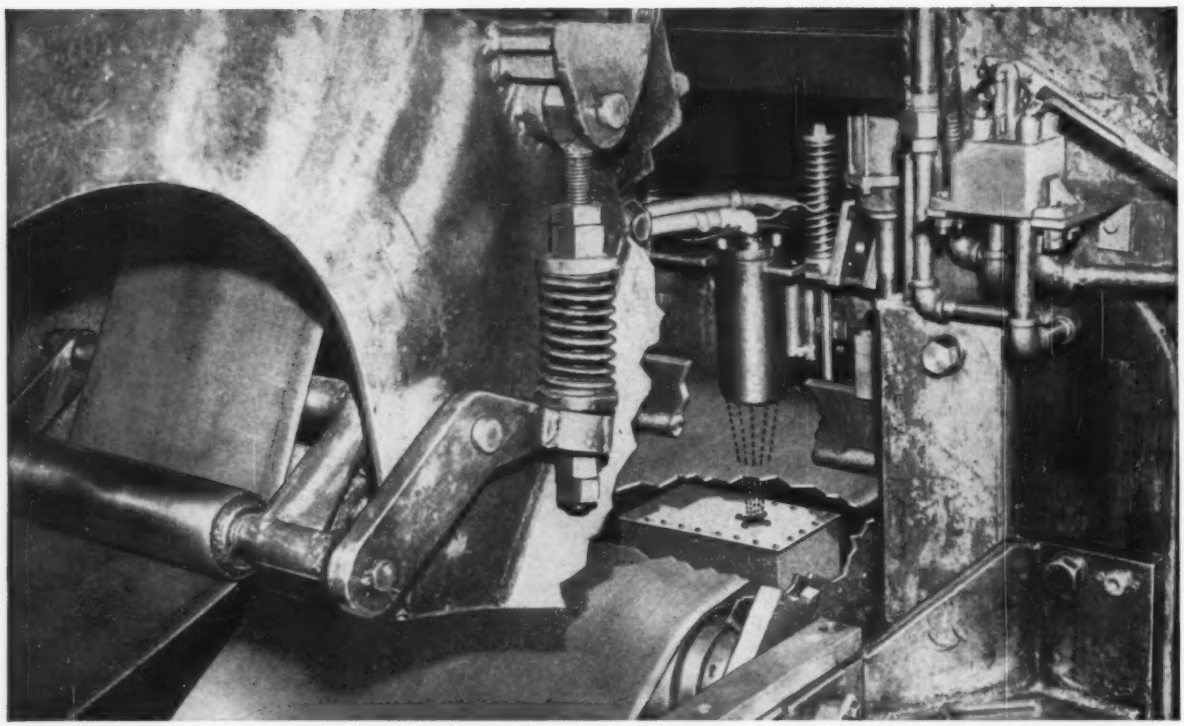


Chase replaces pioneer XACTRAY with advanced new models—

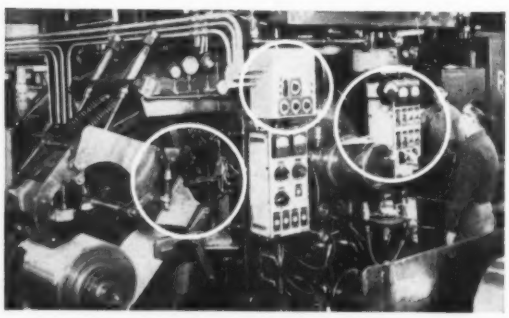
after 10 years' reliable service

Two of the earliest XactRAY non-contact thickness gauges were recently retired from cold rolling mills at the Cleveland, Ohio, plant of Chase Brass and Copper Co., Inc. They were replaced by new XactRAYs—incorporating superior components, such as the low-heat-coefficient Weston Vamistor®, and pulsed X-ray sources . . . greatly reduced in size and total radiation ...which have been developed in the intervening decade.

This replacement by Chase . . . after ten years' experience with Industrial Gauges non-contact measuring systems . . . is characteristic of the high acceptance XactRAY has earned throughout the metals industry.

The cutaway picture, above, shows one of Chase's new XactRAYs—fitted into limited space, deep within the mill. The X-ray source, consisting of the X-ray tube and high voltage coils, is contained in a small sealed case mounted below the strip. The receiver is mounted well above. The accuracy of the gauge is unaffected by vertical movement of the strip, and the wide airgap also facilitates threading.

XactRAY offers absolute thickness indication. And absolute calibration is built into the equipment . . . is unchanging for the life of the equipment.



XactRAY, today, is the most widely used non-contact thickness gauge in the metals industries. It has been proved accurate and convenient — even with varying non-ferrous alloys. XactRAY is being used, for example, for the automatic control of the thickness of coinage strip for all United States coins — which range from silver to copper-nickel, and bronze.

For further information, contact your local Weston representative . . . or write to Daystrom-Weston Sales Division, Newark 12, N. J. *In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.*

DAYSTROM WESTON *Industrial Gauges*

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the well-guarded secret it's tough **NOT** to talk about

SCOVILL *quality can put you ahead of competition*

Many fabricators, having found Scovill Brass • Copper • Aluminum Mill Products definitely superior, try to keep their source of supply "a deep secret". This is understandable, when you consider the fact that a fabricator's best chances of licking tough competition usually lie in a LITTLE better production rate—a LITTLE better record on down-time, machine and tool maintenance—a LITTLE better quality end-product. All of these "little" improvements loom mighty BIG in the competitive picture—and all are entirely possible when you specify Brass • Copper • Aluminum mill products identified by this trademark . . .

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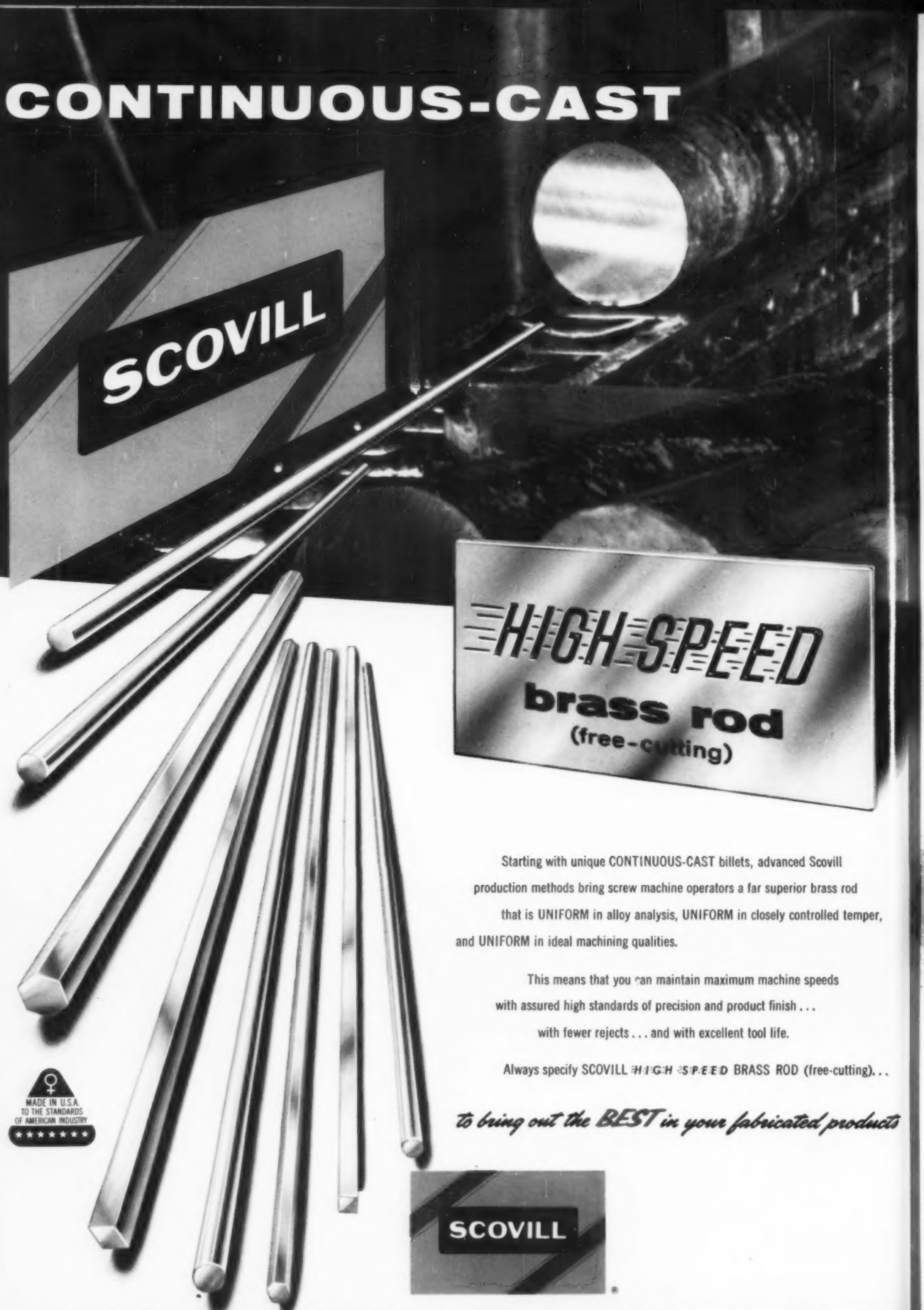
Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn. Phone PLaza 4-1171.

CONTINUOUS-CAST



HIGH-SPEED brass rod (free-cutting)

Starting with unique CONTINUOUS-CAST billets, advanced Scovill production methods bring screw machine operators a far superior brass rod that is UNIFORM in alloy analysis, UNIFORM in closely controlled temper, and UNIFORM in ideal machining qualities.

This means that you can maintain maximum machine speeds with assured high standards of precision and product finish . . . with fewer rejects . . . and with excellent tool life.

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Accent on Excellence

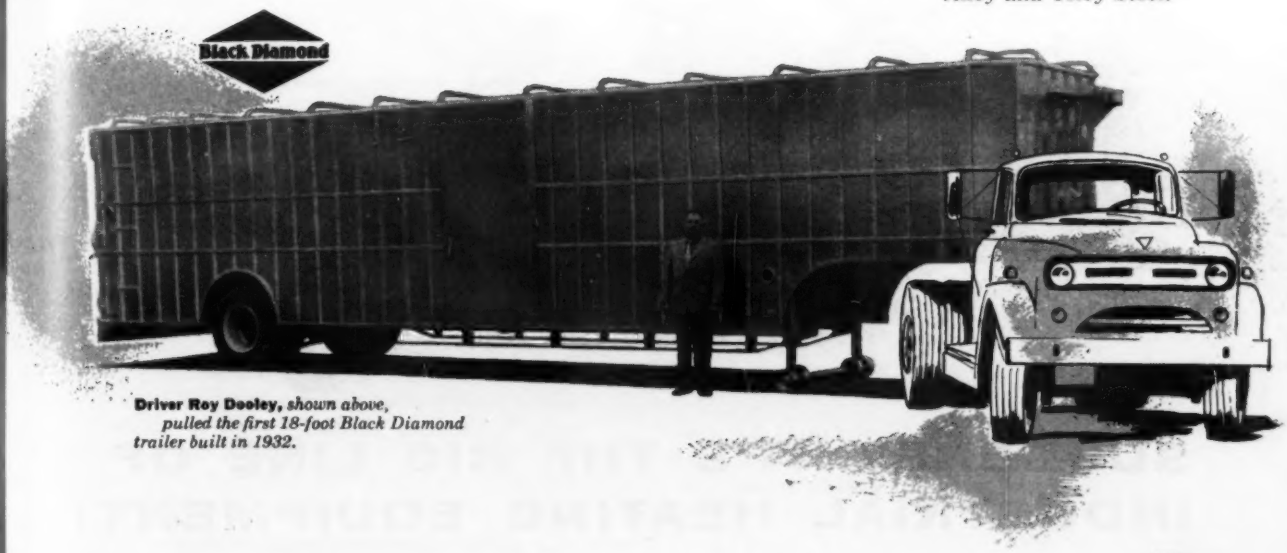
Youngstown Yoloy "E"

high-strength steel

Transport competition is rough today, so trailer vans *must* be stronger, lighter and require less maintenance if hauling operations are to show a profit.

Engineers at Black Diamond Trailer Company of Bristol, Va., report, "For almost a quarter-of-a-century, we have been custom-designing our trailer line around Youngstown Yoloy 'E' High-Strength Sheets and Plates. They save us weight, provide extra strength and give exceptionally high resistance to atmospheric corrosion. Also, Yoloy's ductility and excellent weldability help speed-up our production operations."

Wherever high-strength steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence". The Youngstown Sheet and Tube Company, Youngstown, Ohio. Carbon, Alloy and Yoloy Steel.

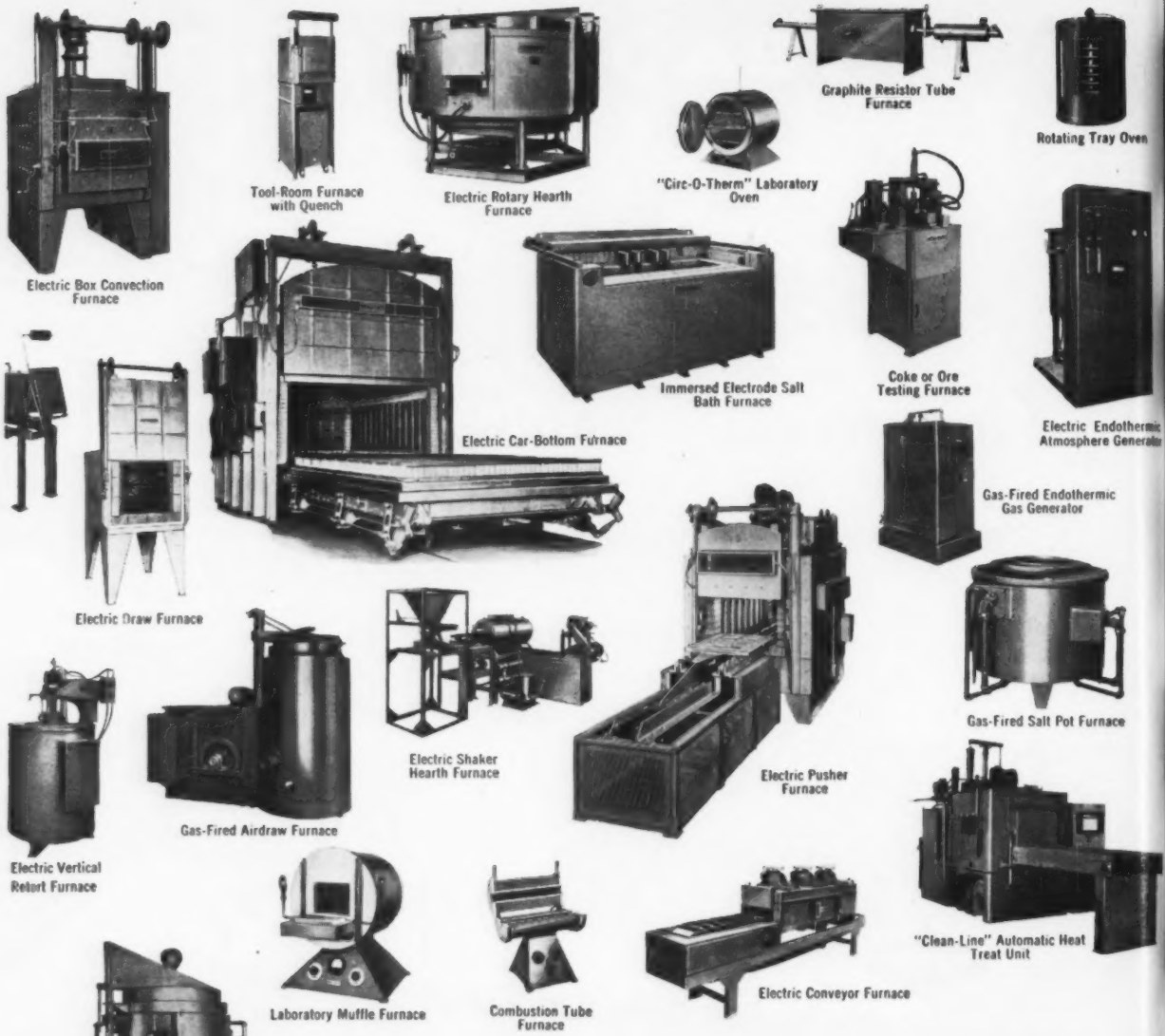


Driver Roy Dooley, *shown above, pulled the first 18-foot Black Diamond trailer built in 1932.*

QUALITY YOUNGSTOWN SERVICE

Youngstown

Send for free technical bulletin on Youngstown Yoloy "E" Steel.



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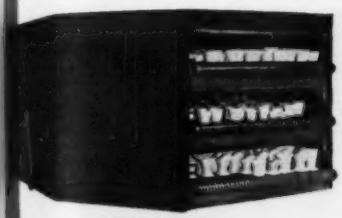
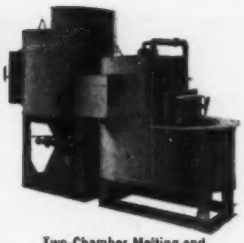
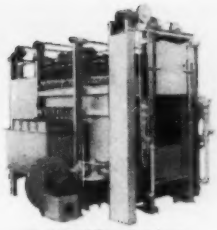


Multi-Level Belt Dryer

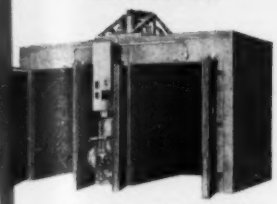
Monorail Conveyor Oven



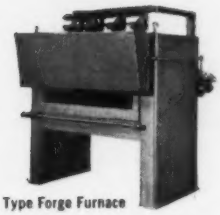
Two-Chamber Melting and Holding Furnace



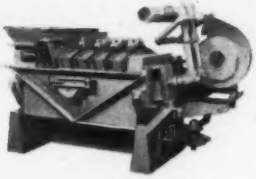
Fuel-Fired Reverberatory Furnace



Two-Chamber, Rack-Loaded Oven



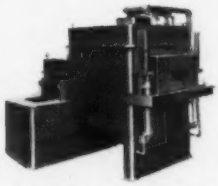
Slot Type Forge Furnace



Cradle-Type Melting Furnace

Reverberatory Aluminum Melting Furnace

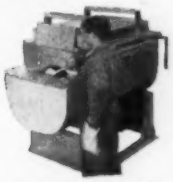
Gas-Fired Tray Loaded Oven



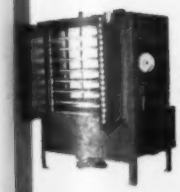
Double Chamber Dry Hearth Melting and Holding Furnace

Magnesium Melting and Holding Furnace

Gas-Fired Barrel Melting Furnace

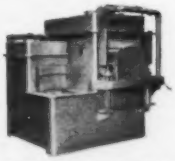


Electric Resistance Holding Furnace

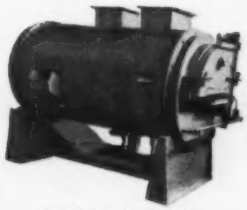


Electric Tray Loaded Oven

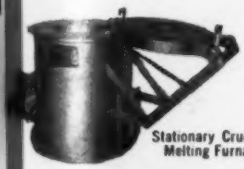
Iron Pot Melting Furnace



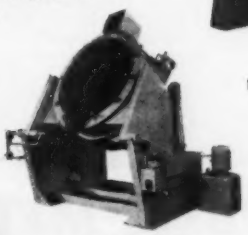
Double Chamber Aluminum Melting and Holding Furnace



Double Chamber Barrel Furnace

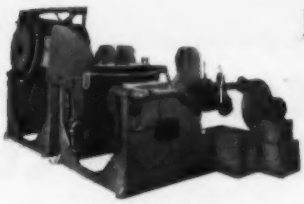


Stationary Crucible Melting Furnace

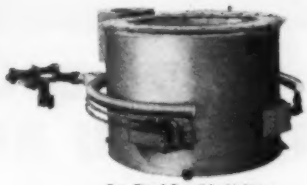


Hydraulic Tilt Iron Pot Furnace

Electric Crucible Holding Furnace



Mechanically Tilted Crucible Melting Furnace



Gas-Fired Crucible Melting and Holding Furnace

It was planned for years . . . a big, brand new plant with the latest production facilities . . . the acquisition of several heating equipment companies . . . and suddenly, Hevi-Duty offers the largest, most complete line of electric and fuel fired furnaces and ovens in the industry. Shown here are representative units available.

Write for complete details. Perhaps that expensive "custom-built model" you need is a standard item or a simple adaptation from the *big* Hevi-Duty line.

HEVI-DUTY

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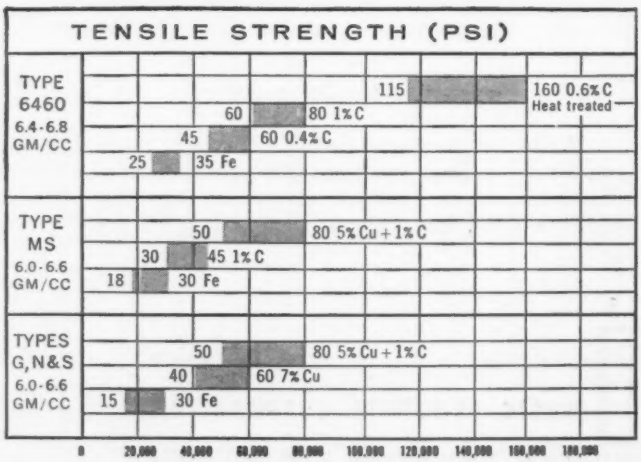
A DIVISION OF BPC — BASIC PRODUCTS CORPORATION

HEVI-DUTY ELECTRIC COMPANY, MILWAUKEE 1, WISCONSIN

5 REPUBLIC METAL POWDERS GIVE YOU BROAD SPECTRUM COVERAGE



Just as a spectrum represents a series of wave lengths from low to high, Republic's wide range of iron and alloy powders covers all known physical property requirements of metal powder part fabricators today.

This broad band of coverage, denoted by density and type, is graphically illustrated by the following Republic powders: Controlled Dimensional Factor Types "G" for growth, "N" for normal or zero dimension change, "S" for shrinkage—copper compatible; Type MS—carbon compatible; and carbon compatible, Type HS6460 alloy.

Booklet, ADV. 1014 contains complete technical information on Types G, N, S, and Type MS. Chemical composition, physical properties, and test evaluations on Type HS6460 are contained in Booklet ADV. 1028. Write for your free copies.

REPUBLIC HOT ROLLED SPECIAL BAR SECTIONS LEVEL OFF COSTS for grader blade manufacturer. Shunk Manufacturing Company, Bucyrus, Ohio, has maintained top-quality and its competitive position for over 30 years by using Republic High Carbon Hot Rolled Special Bar Sections for grader blades. The special bar sections are preformed to the predominating cross section of the blade, thus keeping costs down by eliminating most machining and forming operations. Republic Special Bar Sections are available hot rolled or cold drawn in carbon, alloy, and stainless steel. Send coupon for full facts.

REPUBLIC NYLOK® FASTENERS PROVIDE SECURE HOLDING POWER where it's needed most in the Twin Power Riding Mowers produced by Roberton Manufacturing Company, Chicago. A special nylon insert assures positive locking, maximum holding power—even under severe vibration. The insert in nylok fasteners is unaffected by age or cold, has high resistance to heat. For more facts on Republic Nylok Fasteners, mail the coupon.

REPUBLIC GALVANNEALED SHEETS SOLVE CORROSION PROBLEM in Kathabar® units manufactured by Surface Combustion Corporation. Units are designed to lower or raise the relative air humidity through evaporation or absorption of moisture. Republic Galvannealed, used for coil tube sheets, takes all forming operations. Corrosion and rust problems are held to an absolute minimum. Mail coupon for literature.

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World's Widest Range of Standard Steels and Steel Products

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☐ ADV. 1028 on Type HS6460

Send more information on:
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Now—from Allied Research

—a new systems concept for the finishing of metals.

Process Engineering Service

The first—and only—service built around the most important part of your operations . . . your process requirements.

Why a PROCESS Engineering Service?

Allied Research's long and broad experience in helping customers solve process and equipment problems of all types has led to one important conclusion:

Only by integrating equipment with your particular process are you assured of getting these important benefits from your operations: (1) higher production, (2) greater efficiency, (3) lower operating costs, (4) consistent product quality.

Our success in helping our many customers reach these important objectives has prompted us to offer this unique service to the entire metal finishing industry.

What does our Process Engineering Service consist of?

CONSULTATION—Experienced representatives will assist you in properly planning any part of or all your process and equipment requirements.

RECOMMENDATION—Trained engineers will recommend the particular process, equipment and chemicals to provide you with the best in operating efficiency and economy for your specific production requirements.

INSTALLATION—Planned, engineered and supervised—including plumbing, electrical, ventilation and disposal requirements—or whatever else is needed to assure efficient and proper operations.

SERVICE—Field Engineers insure proper start-up and will make necessary maintenance recommendations. They are available for periodic check-up.

"TURN-KEY" Service—let Allied Research take complete responsibility for laying-out, designing, building, installing and servicing your complete process operations. *Open the door to your plant and start production.*

Get the complete details on Process Engineering Service today. Call your Allied Field Engineer. He's listed under "Plating Supplies and Equipment" in the yellow pages. FREE TECHNICAL DATA FILES on Allied Research processes, equipment and chemicals sent on request.

Allied Research Products, Inc.

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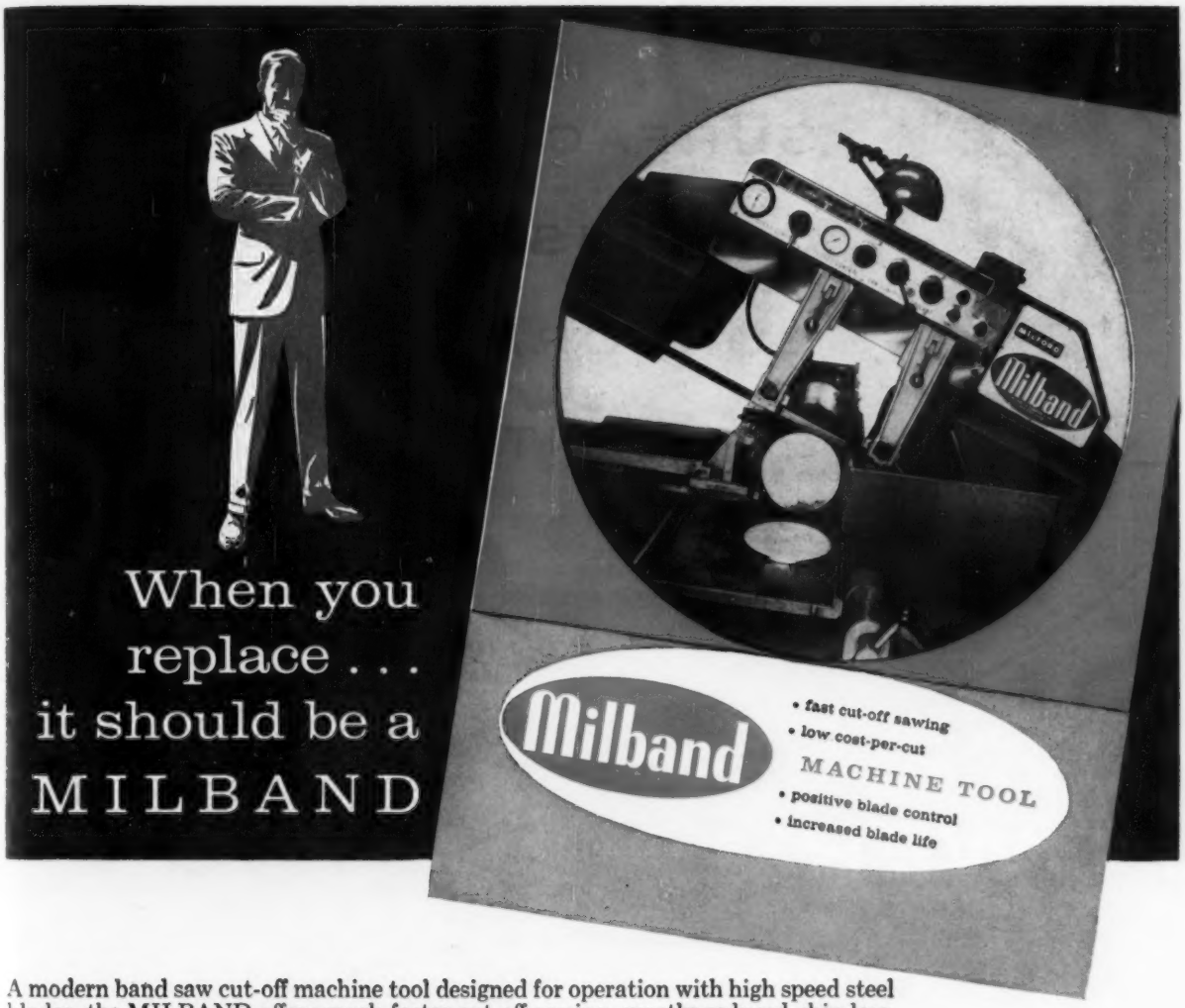
BRANCH PLANT: 400 MIDLAND AVENUE • DETROIT 3, MICHIGAN
West Coast Licensee for Process Chemicals: L. H. Butcher Co.

Chemical and Electrochemical Processes, Anodes, Rectifiers Equipment, and Supplies for Metal Finishing

IRIDITE® Chromate Coatings | IRILAC™ Clear Coatings | ISOBRITE® Plating Brighteners | ARP® Chemicals & Supplies | WAGNER Line of Equipment


When you replace . . . it should be a MILBAND
Milband
• fast cut-off sawing
• low cost-per-cut
MACHINE TOOL
• positive blade control
• increased blade life

A modern band saw cut-off machine tool designed for operation with high speed steel blades, the MILBAND offers much faster cut-off sawing, greatly reduced chip loss, and cuts consistently smoother, straighter and more accurately. *Your* next investment in cut-off equipment *should* be a MILBAND!

The circular featured above covers all the important facts about the many advantages offered by continuous-action band sawing. It also covers all the design and construction features that make the MILBAND Machine Tool today's (AND tomorrow's) wisest investment in a cut-off machine. Use the coupon below to send for your free copy, and check the facts for yourself. If you want additional dollars-and-cents proof, we'll be glad to run actual tests on a MILBAND Band Saw Machine Tool and submit a complete time-and-cost analysis report.

MILBAND MACHINE TOOL DIVISION

THE HENRY G. THOMPSON & SON CO. NEW HAVEN 5, CONNECTICUT

Saw Specialists For Over 80 Years

MILFORD — HACK SAW & BAND SAW BLADES — HOLE SAWS • GROUND FLAT

FILL IN AND MAIL TODAY!

THE HENRY G. THOMPSON & SON CO.
278 Chapel St., New Haven 5, Conn.

☐ Please send my free copy of the MILFORD circular giving complete information on the modern, band saw cut-off method with the MILBAND Band Saw Machine Tool.

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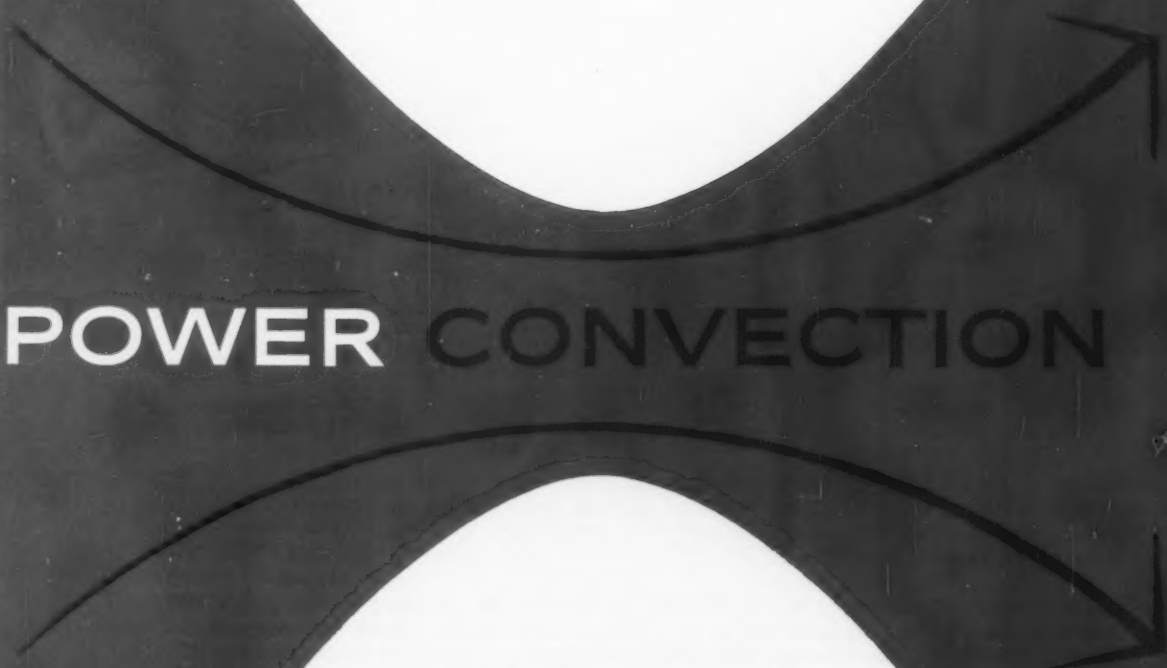
SURFACE

COMBUSTION

CORPORATION

PRESENTS



POWER CONVECTION

...the most significant breakthrough in heat treating technology in twenty years.

If you could step from a gentle summer breeze into an airstream of gale velocity, you'd get some idea of the vast difference between the convection often used in industrial heat treating and the new Surface Power Convection.

With Surface Power Convection, air velocities of 150 miles per hour or more are not uncommon. The work is heated under precise control in a fraction of the time usually required. Unprecedented product uniformity is achieved. Production per unit of floor space and per dollar of invested capital is raised to levels that were impossible only a few years ago.

Surface Power Convection will be demonstrated at the Metal Show in Booth 648. Be sure to see it.

fundamentals of SURFACE POWER CONVECTION

So great is the difference between ordinary convection and Surface Power Convection that it will be well to discuss this development in the light of a few fundamentals.

A heat treating furnace is essentially a device in which heat transfer by radiation, convection, and conduction takes place under control, to put parts through a time-temperature cycle.

Heat transfer by conduction serves primarily to distribute heat within the work-piece. Transfer of heat to or from the parts is by radiation and convection.

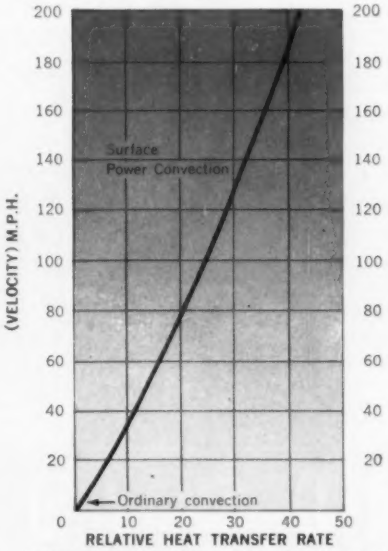
To speed production, we can increase the rate of radiant heat transfer with very high "thermal heads," in other words, with very hot "radiators."

We soon encounter many limitations, however. The geometry of the work-pieces or the load of parts in the furnace may cause parts of the work to overheat long before the main mass of the part or load is up to temperature. Differences in surface quality or color will change the heat absorbing ability of the metal and result in uneven heating and non-uniform results. Furthermore, when "radiator" temperature is substantially above desired maximum work-piece temperature, control of heat transfer rate is critical and difficult.

Finally, thermal heads are limited by the very practical problem of the maximum operating temperatures of the materials feasible for radiators and other structural material in the furnaces—usually about 2000° F.

On the other hand, with *convection*, we can increase the rate of heat transfer without such critical control problems or dangers of overheating, by raising the velocity of air movement and maintaining only a relatively small thermal head.

The amount of heat transferred to the work is now determined mainly by the velocity of air movement, and hence we can raise the upper limits of heating rates very significantly. The desirability of convection heat transfer at extreme velocity has long been known; its advantages in terms of improved uniformity, increased speed, and reduced floor space are clear.



Surface Power Convection utilizes the highest air velocity to achieve a maximum heat transfer coefficient consistent with application requirements.

Why, then was Power Convection not developed long ago? Chiefly because the engineering design problems—involving mechanics, aerodynamics, thermodynamics, metallurgy, to name only a few—were so formidable. For instance, fan blades had to be designed for maximum aerodynamic performance, to operate continuously under high dynamic stress at elevated temperatures. This brought a host of problems unheard of in conventional furnace design and manufacture. Soon it became apparent that air movement patterns were determined not just by fan design but by the geometry of the parts, density of loading, configuration of the furnace interior, baffles and work handling devices.

It was not enough just to build fans that would function in extreme environments: it was a matter of accumulating a wealth of new data on high temperature convection in a range of velocities never before explored, then solving a large array of interrelated problems so that reliable predictions of furnace performance could be made.

In effect, the furnaces would behave like wind tunnels, handling air at temperatures close to the physical limits of our materials. This is what Surface has developed over a period of years.

We can now present and define a new measure of furnace performance: *convection power*—a rating of the capability of a furnace to transfer heat to its work load primarily by convection, with great speed, uniformity, and efficiency. And convection power can now be evaluated in economic terms.

While some problems remain to be fully worked out, we have charted such a large area of this new technology that we can say with confidence:

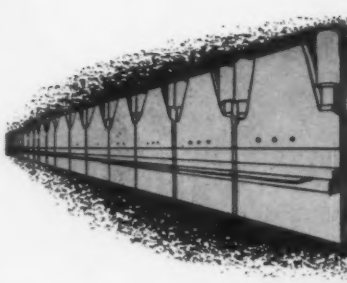
Surface Power Convection raises the capabilities of heat treat production significantly above previously accepted limits of performance. Cooling as well as heating is remarkably speeded up, and the uniformity of heat treatment in controlled atmospheres is improved.

Surface Power Convection now permits designing furnaces with heat transfer rates limited not by our abilities to produce and distribute heat, but by the physical abilities of work-pieces to absorb it.

Write for Bulletin SC-182 for further data on this new development.

SURFACE COMBUSTION CORPORATION
2373 Dorr Street, Toledo 1, Ohio

Surface



4,769 years to arrive ACCURATE HYDRAULIC

122 out of 124 hydraulic press brakes in U.S. aircraft industry are PACIFIC

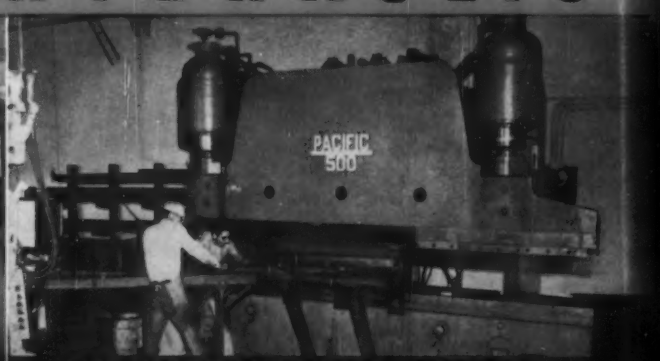
Aircraft manufacturers work to the closest tolerances of all industries in metal forming. Douglas Aircraft Company, Tulsa, Oklahoma, with 8 Pacific Brakes (above) is typical of the airframe manufacturers who have selected Pacific for its precise accuracy.

924 PACIFIC Brakes, representing over 95% of all hydraulic press brakes in use today, have operated for an aggregate of 4,769 years to test and confirm PACIFIC designs that have established hydraulic press brakes as far more profitable to operate than mechanical brakes. However, only PACIFIC has precise accuracy, versatility, high speed and dependability that comes from years of experience in manufacturing, developing and improving this unique machine. It is the only hydraulic press brake in daily operation that is actually air bending, straightening, deep drawing, blanking, and doing heavy punching. Accuracy within thousandths of an inch (greater than with any mechanical or other hydraulic brake) repeats itself on every stroke. Ram remains level regardless of location of work on the bed. PACIFIC sizes range from 60 tons to 1500 tons.

PACIFIC HYDRAULIC

Only hydraulic brake built for HEAVY PUNCHING

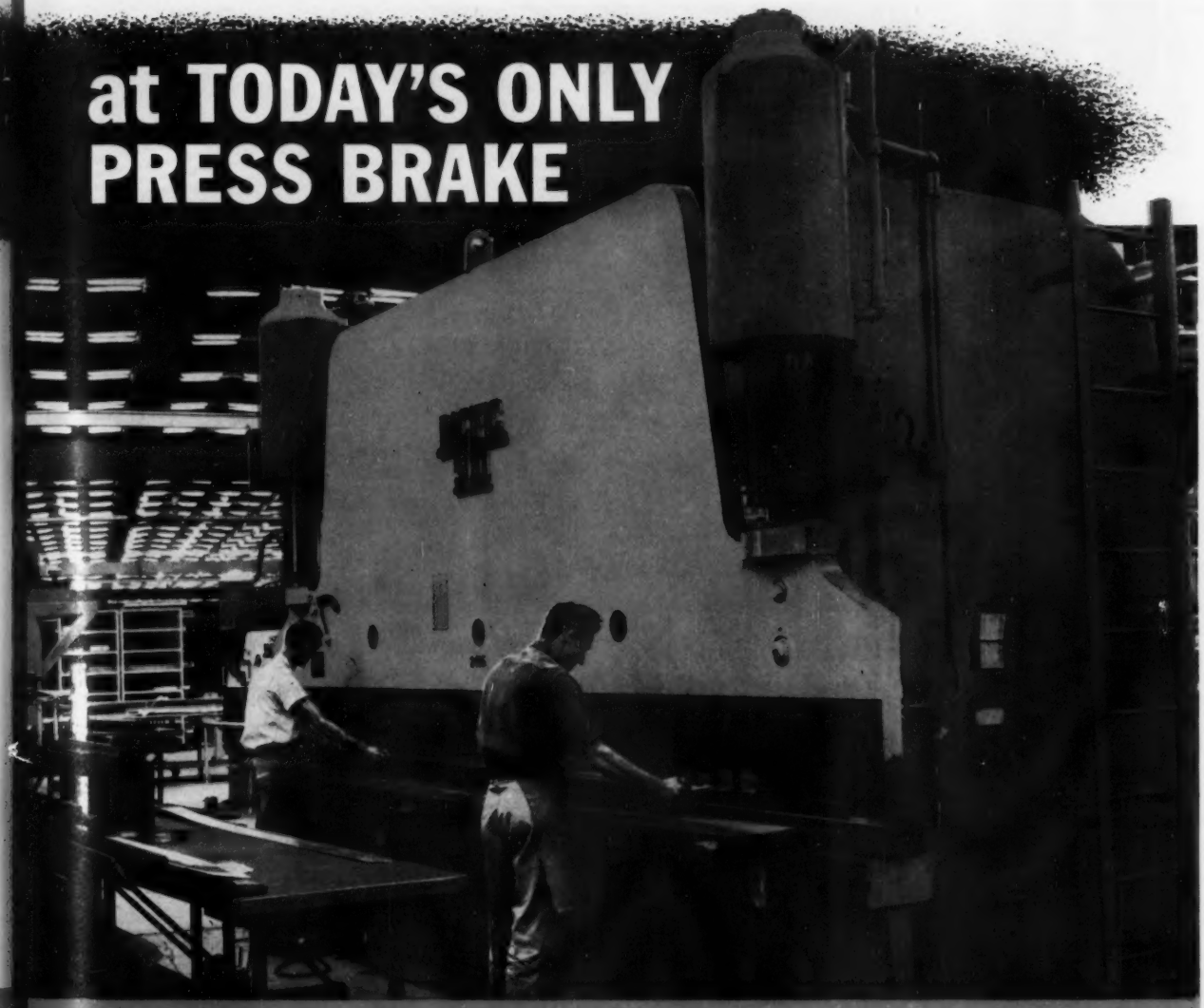
Pacific is uniquely designed to absorb heavy shock from punching in the hydraulic system rather than in the frame of the brake. Cushioned against shock, punch and dies stand up from 3 to 8 times longer than with mechanical brakes. Photo (above) shows 1" alloy steel plate being punched at earthmoving equipment plant.



MAINTENANCE-FREE for years

Dependable, simplified electrical and hydraulic controls can easily be kept working continuously by any plant maintenance crew. There are no complicated electronic devices. In photo (above) at agricultural equipment plant, the 500 ton Pacific Hydraulic Brake shearing ¾" alloy steel plate with Pacific Shearing Attachment has operated continuously for the first 4 years at a cost of $5.22 in replacement parts.

at TODAY'S ONLY PRESS BRAKE



PRESS BRAKE

HIGH SPEED operation

Pacific adjustable stroke length can be shortened for rapid stroking. Automatic, self-leveling ram permits use of progressive dies across entire bed of press. The automatically-fed Pacific at automotive parts plant, which can cycle up to seventy 1½" strokes per minute, is forming 3780 operations per hour in the above photo. In virtually any operation, Pacific's high cycling speed equals or exceeds materials handling capacity.

Write for brochure

PACIFIC INDUSTRIAL MANUFACTURING COMPANY

848 49th AVE., OAKLAND, CALIF.

PLANTS:

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In the automotive industry alone, there are 30 Cold Bonderite installations.

How Cold Bonderite System cuts costs

Some actual user-experiences of savings in heat requirements, maintenance, water and electricity, and equipment after installing Cold Bonderite System.

Less than two years ago, the first public announcement of Parker's Cold Bonderite System was made.

Now, well over a hundred plants are using this revolutionary, money-saving system of phosphate-treating at low temperatures.

Some are among the country's largest plants, others are quite modest in size and production. Products treated range the list from automobile bodies to small appliance components.

From these users we have compiled a long list of documented savings records. In many cases, cost reductions have been greater than we had hoped to achieve.

The temperature tells the story! Cold Bonderite System solutions operate 60° to 75° cooler.

Heat Saved

The greatest percentage savings in heat requirements (90%) has been reported by an automotive plant. Before installing Cold Bonderite System, the finishing line used 50,000 pounds of steam an hour. Cold Bonderite in the line uses only 5,000 pounds per hour.

In another auto plant, heat savings are figured at 74% on a body line. A small parts finishing line in the same plant shows the same percentage reduction in heat requirements.

A manufacturer of metal cabinets reduced gas consumption for heating his phosphating line from 33,000 to 14,000 cu. ft. per day—a 56% reduction—by installing the Cold Bonderite System.

A famous maker of household equipment changed from conventional phos-

phating to Cold Bonderite System and saw his steam use plummet 66%.

Another manufacturer, an Eastern small appliance maker, reports that on gas expense alone he has cut his phosphating costs 45%.

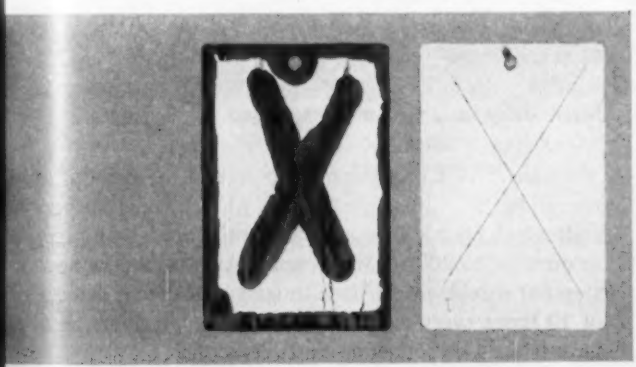
Other Savings Pile Up

The magnitude of other savings, beyond heat consumption, has been surprising to users and very good news to their cost accounting departments.

Electricity, for instance. At the greatly reduced temperatures of the solutions, there is no need to operate exhaust fans. In one installation, the change to Cold Bonderite eliminated the need for replacing a $15,000 exhaust system.

Water use is reduced about 25% because there is less evaporation.

Maintenance costs nosedive with Cold Bonderite System in the finishing line. Lower temperatures in the heating coils mean less frequent—or no necessity for—cleaning the coils. When there is service to be performed, the maintenance crew can move right in without waiting for the installation to cool off.



Comparative 48-hour salt spray test proves performance. Left, untreated panel; right, panel Cold Bonderite-treated before painting.

One user figures that he has eliminated 364 manhours of maintenance time yearly with his Cold Bonderite System.

The same manufacturer has discovered, too, that the reduced temperatures have allowed him to eliminate a number of steam traps and steam coils costing over $8,000.

Coating Quality Is High

While Cold Bonderite System is saving money on the phosphating line in these many ways, there has been absolutely no diminution of quality in the coatings or their performance.

The Bonderite coating produced by low-temperature Cold Bonderite System matches the high standards set by Bonderite for thirty years. In salt spray, humidity and outdoor exposure tests, as well as in actual service on automobiles, appliances, furniture and many other products, performance has been proven.

Results are uniform hour after hour and day after day. Control and operation of the system is simple and practically foolproof.

Chemical Costs Held Low

All the savings attained by the use of Cold Bonderite System are *real* savings. They show up on the P & L statement because *chemical costs for this revolutionary development are not increased.* The special Bonderites and Parco Cleaners are strictly comparable to conventional hot treatments in the cost of treatment per square foot.

Only Parker Has Cold System

There is, actually, no other system like it. Cold Bonderite System was developed by Parker research, tested and perfected by Parker chemists. It has been proven over and over again as the way to get superior phosphate coatings on steel with spectacular savings.

The Parker representative in your territory is ready to advise and work with you to change your phosphating installation over to Cold Bonderite System. Call him in or write direct to Parker, Detroit.

**Bonderite, Bonderlube, Parco, Parco Lubrite – Reg. U.S. Pat. Off.*

PARKER RUST PROOF COMPANY

2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base | BONDERITE and BONDERLUBE aids in cold forming of metals | PARCO COMPOUND rust resistant | PARCO LUBRITE—wear resistant for friction surfaces | TROPICAL—heavy duty maintenance paints since 1883

CF&I WIRE HELPS

PACKAGED for YOUR PRODUCTION

Compact shaped coil ready for shipment

"CF&I shaped coils have saved us 25% in storage, 20% in downtime, have increased our production by over 20%, and have enabled us to produce a higher quality product."—said Mr. Sol Lipshitz, president of Reforce Steel and Wire Corp., Brooklyn, New York.

Problem: "Previously with small coils, we had to stop our machine every 25 minutes to butt-weld the end of a new coil to the used-up coil. As we had to go to this trouble twenty times a day, we were losing 1½ to 2 hours daily in downtime," explained Mr. Lipshitz.

Solution: "A CF&I salesman carefully examined our operation; then he suggested that we use CF&I shaped coils which hold 2500 pounds of continuous length wire, as opposed to 200 or 300 pounds. As a result, we now stop our machine only once to start a new coil, instead of 10 times every day. We save nearly two hours, and have increased production by 20%.

"In addition, CF&I shaped coils have greatly reduced unloading time. Now when we receive a truckload of wire, we unload and store 15 pieces instead of 200. This not only saves time, but freight expenses as well because we now store much more and have to order one-fifth as often."

CF&I heavy coil mounted on spider for pay-off. This heavy coil contains 2500 pounds of continuous length of wire—enough wire for one-half day's production at the Reforce Steel and Wire Corp. "By virtually eliminating downtime with these heavy coils, we have increased production by 20%," said Reforce's president.

CUT DOWNTIME 20%

at Reforce Steel and Wire Corporation, Brooklyn, N. Y.

Heavy coils are quickly and easily placed on a revolving spider. The spider, which is leased from Wickwire, acts like a spool and assures smooth, even pay-off. "Because our machine jerks rather than drawing steadily, the small coils frequently pulled over and became tangled," explained Mr. Lipshitz. "CF&I heavy coils on spiders give us a steady flow of wire and make our operation more uniform."

Here you see some of Reforce's finished reinforcing accessories. "CF&I heavy coils have increased the quality of our product," said Mr. Lipshitz. "Small coils require frequent coil and welding. Sometimes, due to different coil melting temperatures, our automatic welding machine failed to make a good bond, forcing us to re-weld some faulty joints. CF&I long length coils have eliminated this problem."

Choose the CF&I wire package that offers one or more of the following benefits for your production:

- **less downtime with extra-long lengths of wire**
- **quick unloading and easy in-plant handling**
- **simplified inventory control**
- **assured cleanliness of the wire**

Our salesman will be glad to study your operation and recommend the wire package that will save you time and money. Call the nearest CF&I office today to set up a "no obligation" appointment.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City San Francisco • San Leandro • Seattle • Spokane • Wichita

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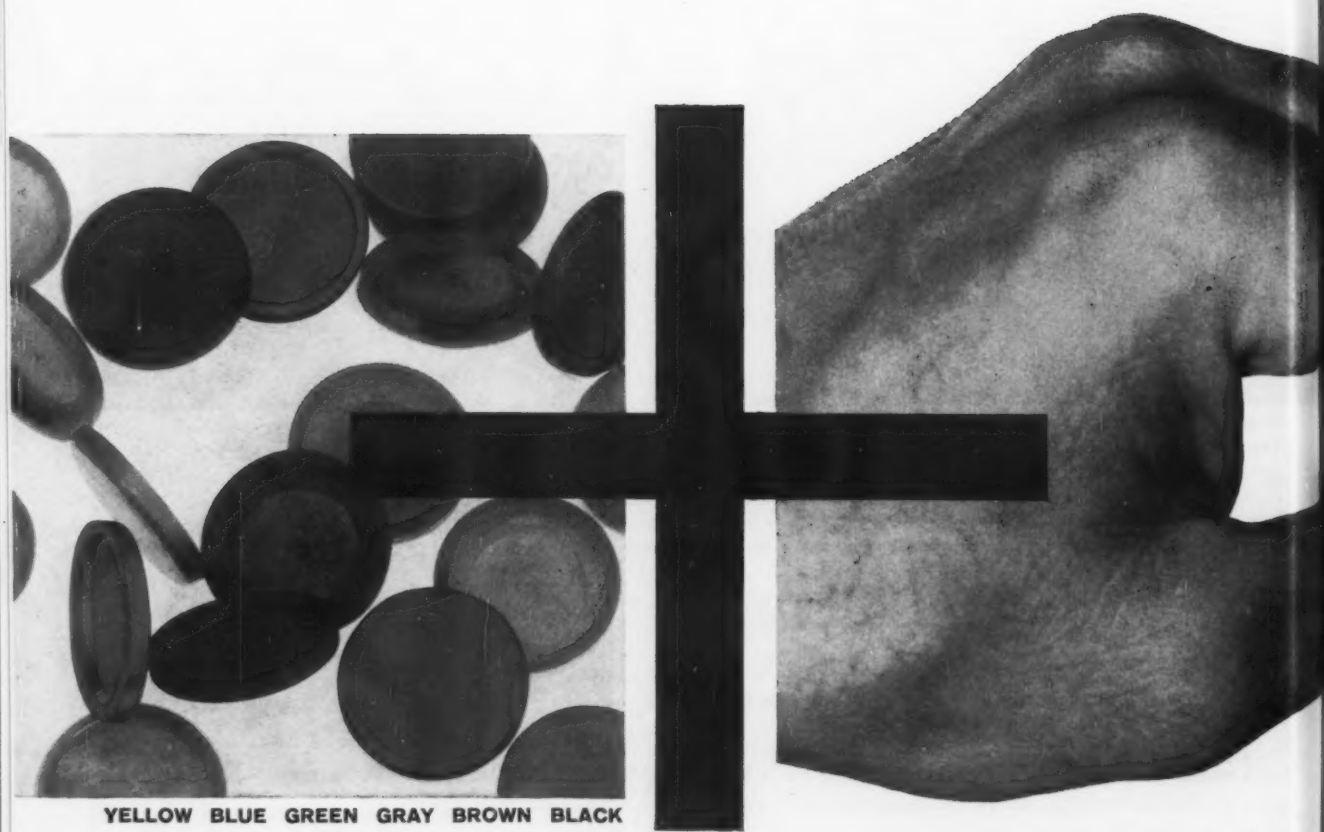
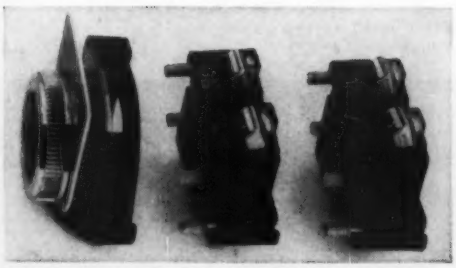


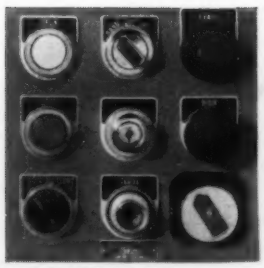
YELLOW BLUE GREEN GRAY BROWN BLACK

WESTINGHOUSE FLUSH PUSHBUTTON

puts the finger on color coding with snap-on color caps !



Shallow contact blocks stack for multiple control circuits. Angled terminals are easy to get at with a screwdriver, even when blocks are stacked.



Available in a full range of operator designs.

HERE'S PRACTICAL PUSHBUTTON COLOR CODING—the economical Westinghouse way. Snap-on color caps let you change colors *without changing buttons.* Simply remove the clamp ring and color caps snap off easily and can be replaced in a matter of seconds.

Simplified color coding is but one of the many pluses for new Westinghouse flush pushbuttons. Thin operator and shallow contact blocks make this pushbutton *thinnest overall.* Contact blocks stack for control of multiple operations, another space-saving feature.

Flush pushbuttons are oiltite, of course. And they meet exacting machine tool and control panel requirements. Available in a full range of operator designs.

Regardless of your pushbutton requirements, order with confidence from industry's most extensive line. Contact your nearby Westinghouse sales office or distributor, or write: Westinghouse Electric Corporation, Standard Control Division, Beaver, Pa.

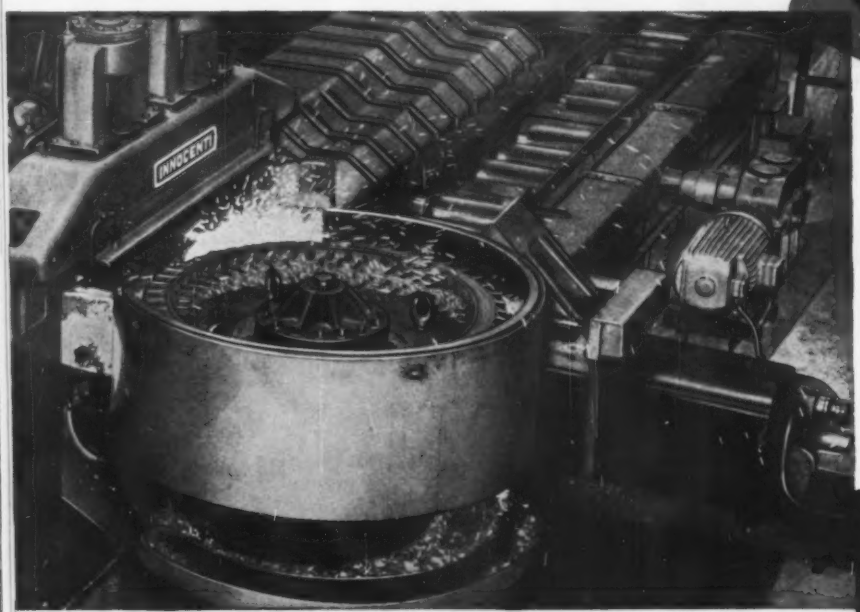
J-30304

YOU CAN BE SURE...IF IT'S **Westinghouse**

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV FRIDAYS

The hot peeling machine introduces a new principle in the ingot conditioning making possible these important advantages:

1) Elimination of the cooling process after stripping with the consequent elimination of cracking dangers.
2) Complete use of the stripping heat which is lost by conventional systems. This will result in the elimination of annealing treatment cost and of scrap dangers.
3) Substantial reduction in working time.
4) Simplification of the whole operating cycle due to saving in material handling.



5) Possibilities of performing a further peeling on the ingot face should a deeper conditioning be required.
6) Improvement of the rolled products when obtained from hot peeled ingots.
7) Complete recovery of peeling chips.
8) Drastic reduction of costs and considerable improvement of the production.

The conditioning cycle is automatic; a 6 t. ingot can be completely machined in 5 minutes without operator's assistance. A daily production of 1000 t. can be obtained.

The machine cost can be amortized in only one year considering the savings and the higher production.

Operation and maintenance are very simple. The hydraulic controls and the automatic operation of the equipment make possible a perfect performance.

bertani a 38

hot ingo pe

INNOCENTI

go peeling machine

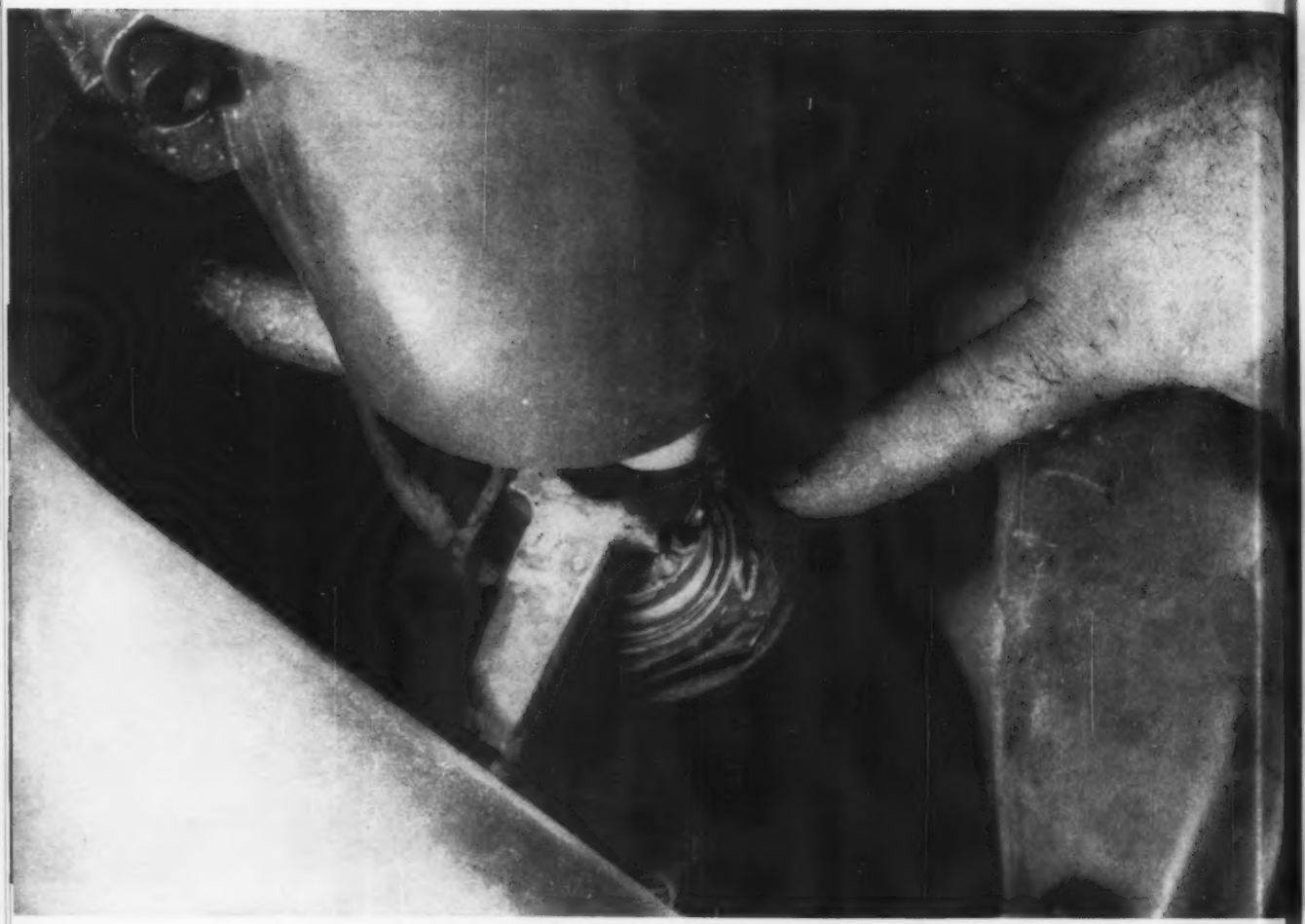
INNOCENTI

società generale per l'industria metallurgica e meccanica

works in milan (italy)

INNOCENTI CORPORATION . 45 Columbus Avenue
NEW YORK 23, N.Y. - Tel. Columbus 5-7795

How NS solved another special steel problem



LENS GRINDING—the intermediate grinding stage, called "fining" is done on this type machine. The square piece of optical glass, with corners trimmed away, is mounted on an overhead chuck which bears down on the fining tool. The fining tool surface is covered with a round piece of wire cloth (man's finger is touching edge of wire cloth) which carries the emulsified emery abrasive used in grinding the lens.

WIRE CLOTH disk is laid over tool surface and pressed down. Pressure-sensitive backing holds wire cloth to tool surface during grinding operation.

NS-REYNOLDS WIRE CLOTH CUTS ERRORS FOR LENS MANUFACTURER

A leading manufacturer of ophthalmic and corrective eye glass lenses has eliminated tool wear, reduced lens grinding error and cut production time with a new integrated surfacing system for grinding tools, utilizing National-Standard Reynolds wire cloth as an abrasive carrier on the tool surface.

NS SOLVES A PROBLEM—Before the addition of the wire cloth tool facing, it was necessary to regrind the lens fining tools after every 3 or 4 lenses—a time consuming, costly procedure. The lens manufacturer came to the Reynolds Wire Division of National-Standard for help in finding a wire cloth with the high-degree of uniformity necessary to serve as a facing for the grinding tools. Reynolds Wire engineers recommended 0.007-inch, electrogalvanized steel wire woven to 30x30 mesh. Wire diameter was held to within a 0.00015-inch tolerance.

Under testing by the lens manufacturer, it was found that the wire cloth's uniformity allowed precision in grinding that virtually eliminated re-working. Grinding tools no longer needed re-truing, human error in finishing was eliminated, and the wire cloth held the grinding abrasive uniformly across the tool face for greater accuracy.

EXPERIENCED ENGINEERING HELP of this kind, for jobs requiring specialty steel and wire is available to you from National-Standard. For the many thousands of applications where only specialty steel or wire will solve the problem, let National-Standard engineers go to work for you. Write for additional information to National-Standard Company, Niles, Michigan.

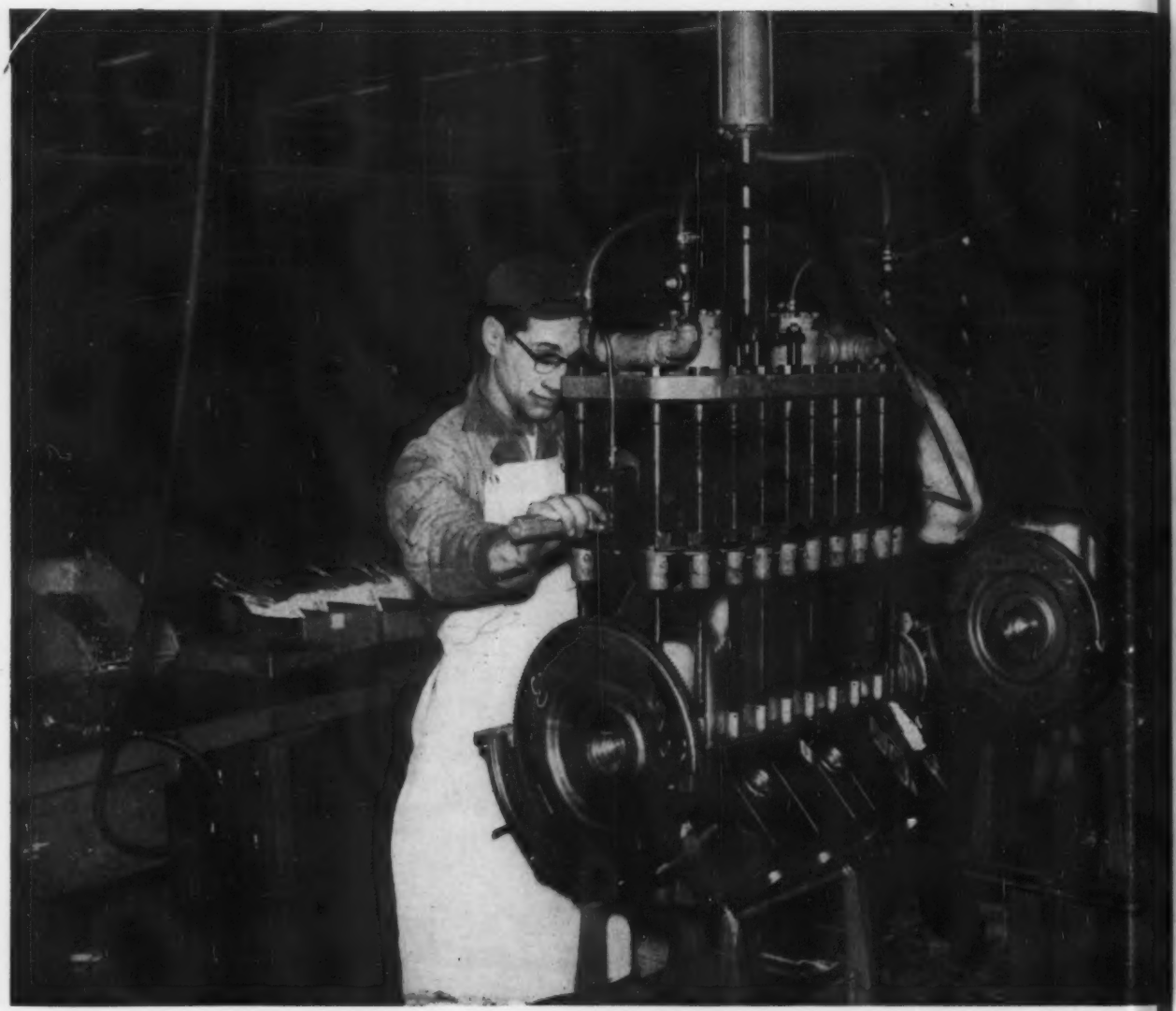
Manufacturer of Specialty Wire and Metal Products

NATIONAL NS STANDARD

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • **WORCESTER WIRE WORKS** Worcester, Mass.; high and low carbon specialty wires • **WAGNER LITHO MACHINERY**, Secaucus, N. J.; metal decorating equipment • **ATHENIA STEEL**, Clifton, N. J.; flat, high-carbon spring steels • **REYNOLDS WIRE**, Dixon, Ill.; industrial wire cloth • **CROSS PERFORATED METALS**, Carbondale, Pa.; decorative, commercial, and industrial perforated metals.

GRINDING TOOL with wire cloth layer is inserted into bottom chuck of fining machine. Chuck rotates the tool for about 8 minutes during fining operation.

LENSES go through fining operation in one of four machines shown in the foreground before being polished in machines at the rear. The addition of wire cloth has also cut the fining operation time.



R/M Homoflex Hose is Strong, Light, Flexible... Easier Handling... Lasts Longer

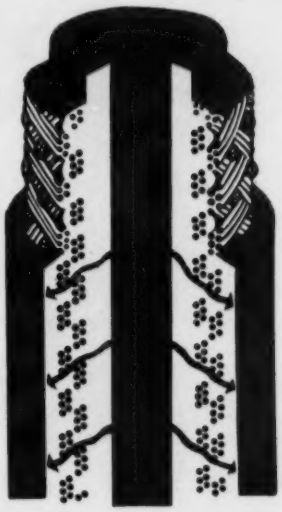
The unique construction of Homoflex Hose adds up to *real* labor and costs savings wherever air, water, and other fluids and gases are handled. It's strong, yet light in weight and "flexible as a rope". Because it's mandrel-made with no pre-set twist, Homoflex coils and uncoils freely in *any* direction *without* kinking! A homogeneous construction, strength member and tube are virtually inseparable, even under the most severe conditions of use around the plant. Mandrel-made also provides uniform inside and outside diameters for faster, easier, *safer* coupling.

Homoflex Hose reduces hose costs because it does a better job and it lasts longer. Ask your R/M representative about Homoflex and other types of R/M hose for factory use. He'll show you why R/M constructions assure "More Use per Dollar" on every job.

ONLY R/M OFFERS

HOMOFLEX

CONSTRUCTION



- **Super-Strong**
- **Precision Built**
- **Flexible as a Rope**
- **Light Weight**

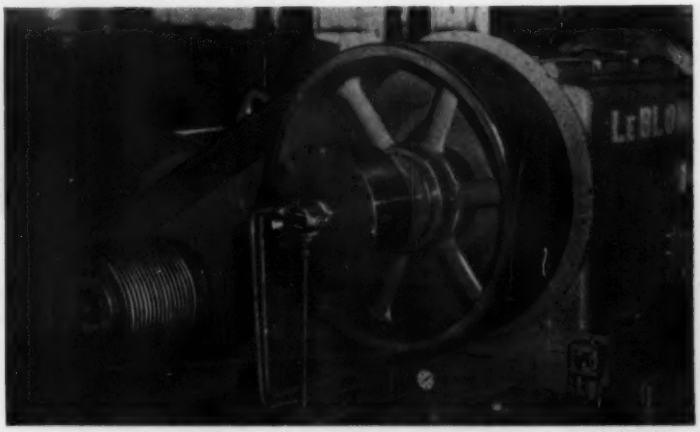
Weighs less than any other hose of equal working pressure.

Note in cross section how specially designed braid permits the rubber tie-gum to penetrate and bond the braided plies during the plastic stage of vulcanization. This results in an inseparable tube-to-cover bond. Write for Bulletins M694 and M610.

"More Use per Dollar"

RAY-MAN CONVEYOR BELT CUTS HANDLING COSTS

Industry's *only* compensated conveyor belt relieves stress of outer plies—both top and bottom—to assure longer life and lower costs for handling bulk materials. Ray-Man troughs easily and trains naturally . . . has the strength and flexibility to carry full loads even where relatively thick, narrow belts are used over small pulleys. Holds fasteners under most severe conditions . . . requires no breaker ply . . . protected against wear, tear, cuts and abrasions with exclusive "XDC" Cover! Write for Ray-Man Bulletin M302 and bulletins on other R/M belts for a wide variety of applications.



R/M POLY-V® DRIVE—*MORE* POWER IN *LESS* SPACE

This patented new power transmission drive features a *single, endless* parallel V-ribbed belt running on sheaves specially designed to mate precisely with the belt ribs. The results? The highest horsepower capacity per inch of drive-width yet possible . . . up to 50% *more* power delivery in the *same* space as a conventional V-belt drive—or *equal* power in as little as ⅗ *the space!* Single unit belt design eliminates belt "matching" problems . . . assures constant belt speed ratios from *no* load to *full* load to provide the smoothest running, coolest running—*longest wearing* drive for your power driven equipment. Just *two* cross sections of Poly-V® Belt meet *every* heavy duty power requirement. Write for Bulletin M141.

®Poly-V is a registered Raybestos-Manhattan trademark.

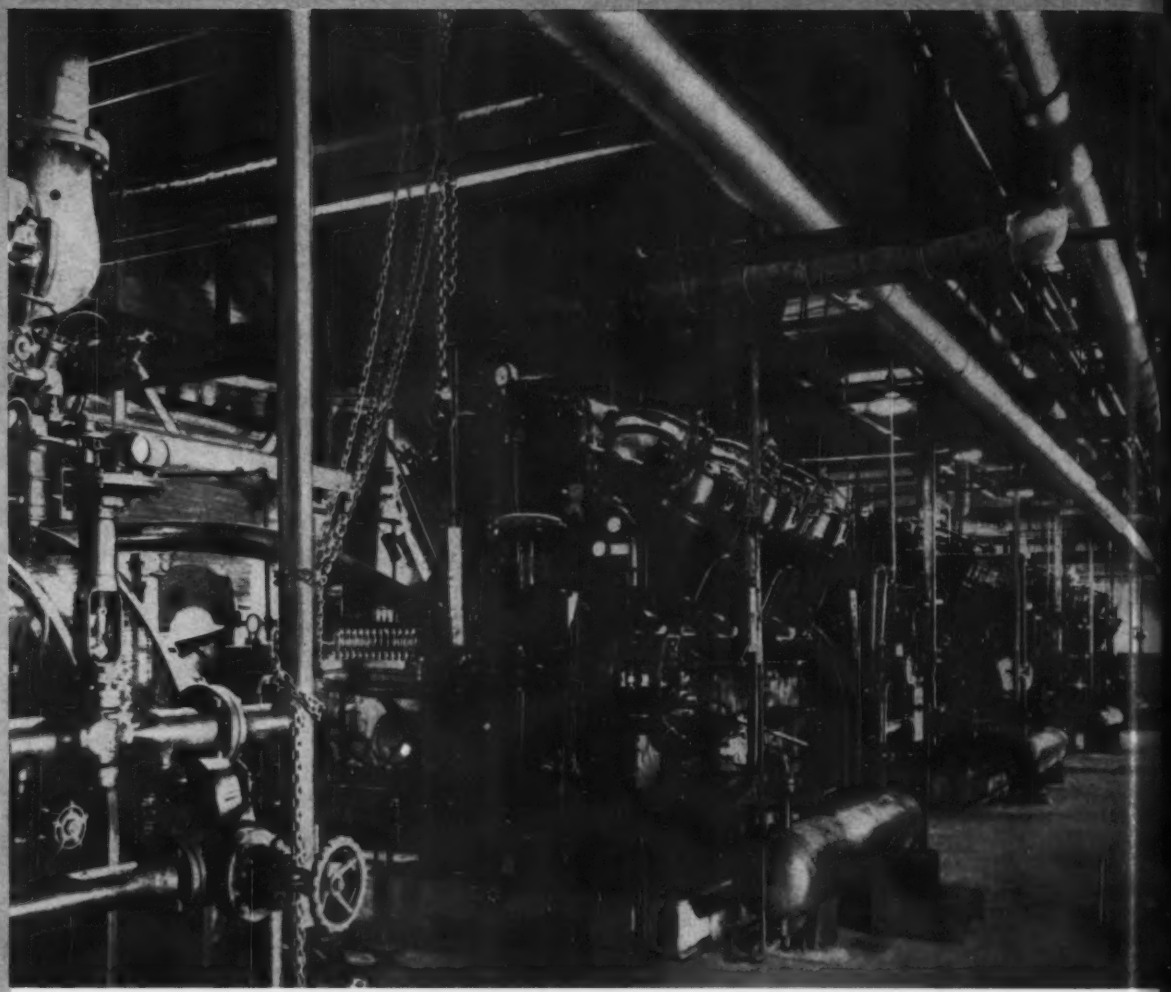
RM919

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls



Cellulubes by Celanese minimize threat of fire and

Protection of your personnel, plant and equipment against fire and explosion is a vital need. Cellulubes made by the Celanese Corporation of America can help you provide this protection. They resist the propagation of flame under conditions which could result in serious fires with other lubricants. And they give you so much more!

FM

Factory Mutual-Approved
(Cellulubes 150 and 220)

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION
DEPT. 578-J, 180 MADISON AVENUE, NEW YORK 16, N. Y.

Please send me:

☐ Technical bulletin ☐ Sample of_____viscosity.

Name_____ Title_____

Company_____

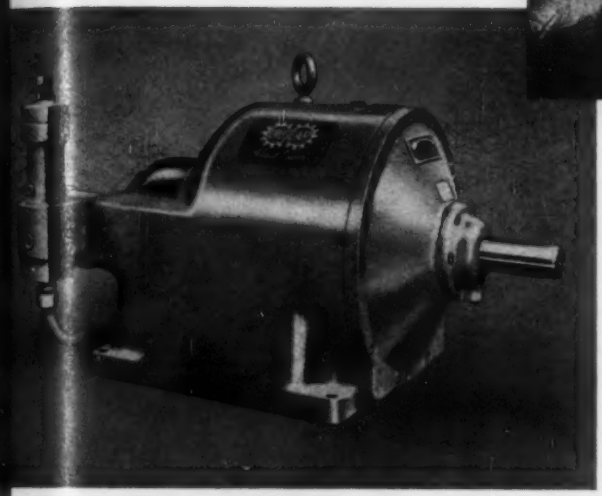
Address_____

City_____ Zone_____ State_____

Application I have in mind_____

CYLINDER WEAR PROVED NEGLIGIBLE when fire-resistant Cellulubes were used to lubricate four Cooper-Bessemer air compressors, as two years' testing showed. Moreover, there were no pressure surges or evidence of fire in the air accumulator. Deposits normally found in compressor auxiliaries and valves were reduced or eliminated thanks to the detergent action of Cellulubes. Conventional lubricators could be used to pump the Cellulubes.

SAFETY, EFFICIENCY, COST SAVINGS are the advantages of Cellulubes discovered by Trunkline Gas Company Texas, after using these lubricant fluids for three years in their air compressors: Cellulubes eliminate risk to personnel from fire, explosion, fragmentation. Cellulubes do not get dirty or burn away by friction or compression. Cellulubes save on replacement costs, downtime, and maintenance. Cellulubes keep machinery smooth-running and clean.



USED FOR YEARS under rigorous conditions in pumps made by the Oilgear Company of Milwaukee, Wisconsin, Cellulubes provided superior protection against excessive wear. Cellulubes, which are phosphate ester synthetic fluids, can be employed in pumps at higher temperatures than fire-resistant fluids which contain water. They are suitable for use in all types of hydraulic pumps being used today, including vane, piston and gear pumps.

and explosion...protect machines against wear

For example, Cellulubes give overall wear protection comparable to that of premium petroleum oils. They present no foaming problem and have no additives which might deposit in the system. In fact, these synthetic lubricants and hydraulic fluids have a cleansing action inside machinery. Their vapor pressure is extremely low; this means that fluid losses are negligible even under severe operating conditions. Cellulubes are available in six viscosity ranges to meet all the standard needs of industry. Viscosity ratings do not change despite the toughest conditions of mechanical shear.

A pioneer in fire-resistant fluids, Celanese offers you years of field experience and research background to serve your needs. For more information on Cellulubes, mail the coupon to us today.

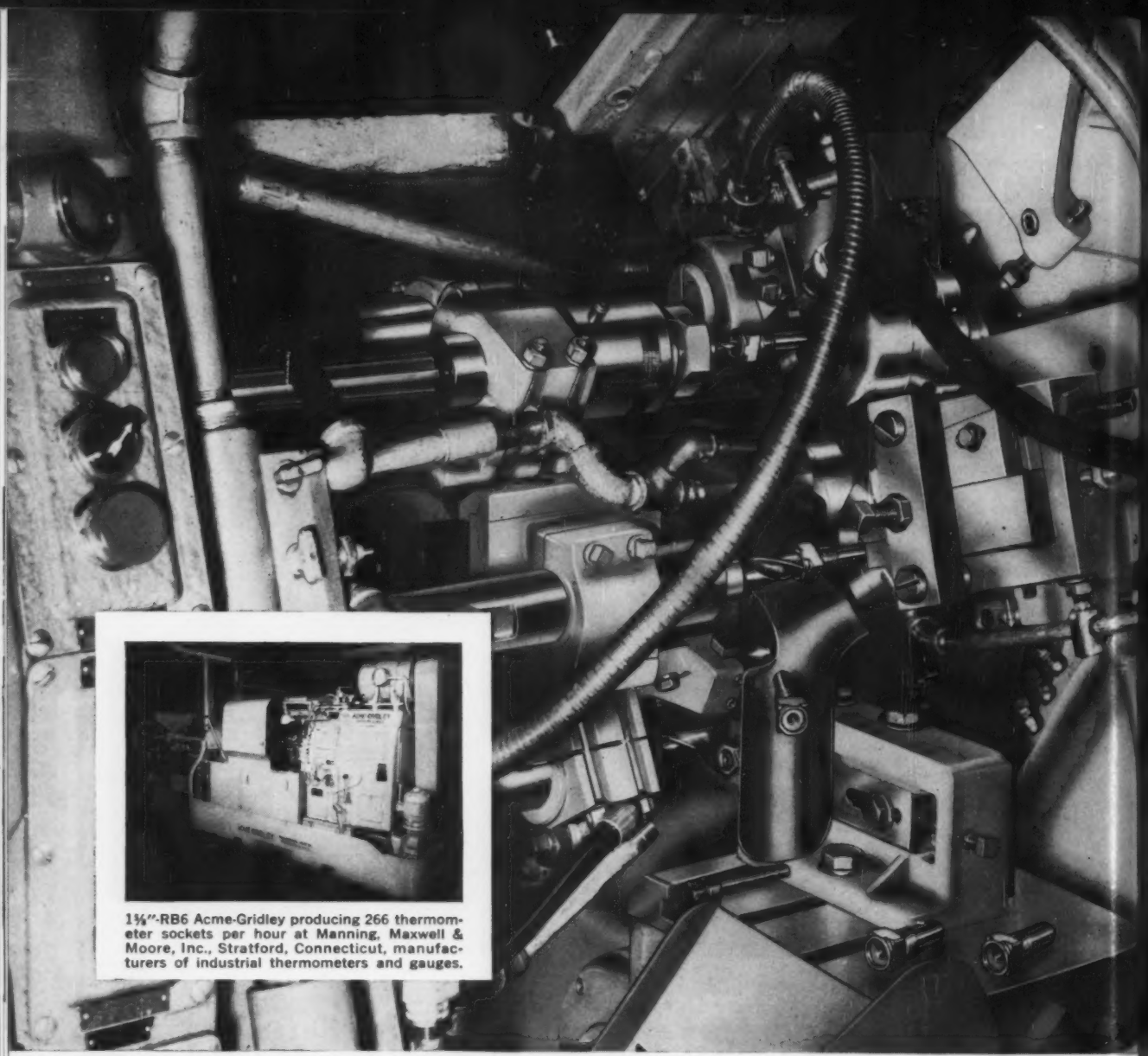
Celanese Corporation of America, Chemical Division, 180 Madison Ave., New York 16, N. Y.

Celanese® Cellulube®

Cellulubes... Celanese CHEMICALS **fire-resistant functional fluids**

In Canada: Canadian Chemical Company Limited, 2035 Guy St., Montreal, Toronto, Vancouver • Export Sales: Amcel Co., Inc., and Pan Amcel Co. Inc., 180 Madison Ave., New York 16

CELANESE CELLULUBES



1¼"-RB6 Acme-Gridley producing 266 thermometer sockets per hour at Manning, Maxwell & Moore, Inc., Stratford, Connecticut, manufacturers of industrial thermometers and gauges.

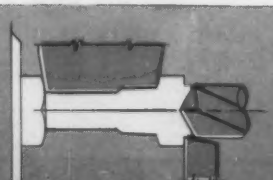
Close-up of tooling zone showing 4th and 5th position operations.

Spindle-for-Spindle

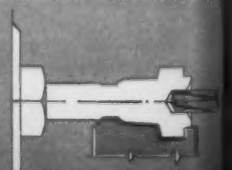
PRODUCTION INCREASED OVER 200%

for Manning, Maxwell & Moore, Inc.

12 Operations in 22 Seconds



6. Rough Form Rear Diameters —Spot Drill—Turn Front Diameter



1. Finish Form Thread and Front Diameter—Drill ¾" Diameter

NATIONAL ACME'S "ZONE OF RESPONSIBILITY" INCLUDES ALL PHASES OF COST REDUCTION

Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Manning, Maxwell & Moore, Inc. . . . an "every day" job for Acme-Gridleys.

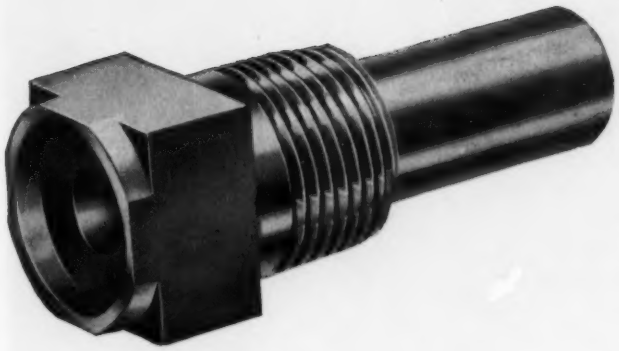
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

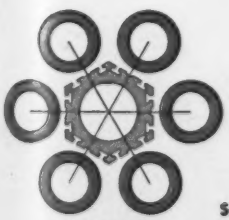


"*Cost-per-piece is substantially reduced* . . . and our increased production has enabled us to keep ahead of competition," says this manufacturer of precision industrial thermometers, gauges and valves.

"Former automatics could not keep pace with production requirements . . . many parts had to be 'farmed out', thus increasing our costs. In addition, the only downtime has been the short periods necessary for tool grinding. What's more . . . a secondary operation for deep-hole drilling was completely eliminated!"

Further benefits were realized with Acme-Gridleys' quick-change, quick-setting toolholders and wide-open tooling zones which enabled Manning, Maxwell & Moore to produce two other parts on the same machine...with only minor changes in the set-up. Add to this the extreme accuracy and flexibility of direct camming and independently operated toolslides, and you will realize why this manufacturer found his Acme-Gridleys a profitable investment.

It will pay *you* to investigate the complete story on the industry's more modern approach to cost reduction. Call, write or wire.

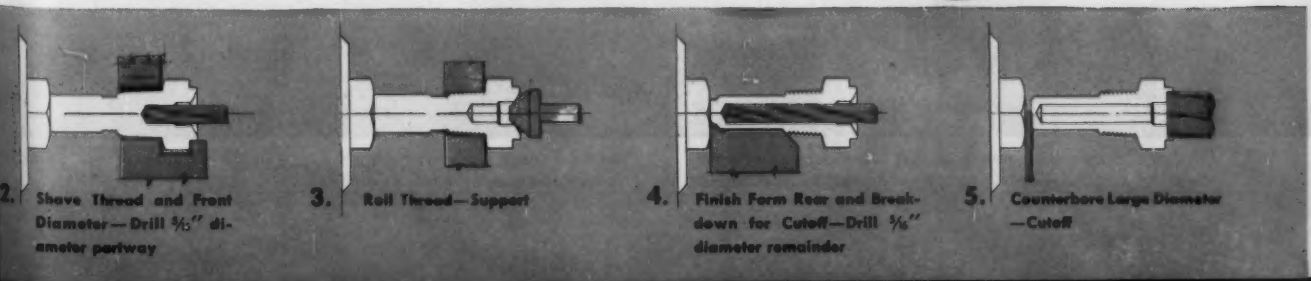


Pioneer in Circumferential Automation

National Acme

THE NATIONAL ACME COMPANY
175 E. 131st STREET
CLEVELAND 8, OHIO

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.



2. Shave Thread and Front Diameter—Drill 5/16" diameter partway

3. Roll Thread—Support

4. Finish Form Rear and Breakdown for Cutoff—Drill 5/16" diameter remainder

5. Counterbore Large Diameter —Cutoff

integrated CRUCIBLE steel service

Orders for specialty steels go out fast — usually overnight or even earlier — from *local* Crucible warehouses.

That's because each warehouse has a wide variety of grades and sizes on hand, *at all times.*

gives you local stocks of 16,000 specialty steel items for immediate delivery

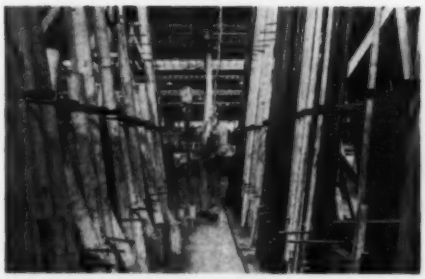
Within minutes, the Crucible inside account salesman can tell you if the grades, sizes and quantities you need are available. He'll check his customer's master file for your delivery requirements, billing details, etc. And then he'll quickly arrange for cutting to meet customer's requirements. So deliveries are swift and sure.

This combination of large local stocks and warehouse efficiency means you can fill even the most varied or unusual requisitions for specialty steels with a single phone call.

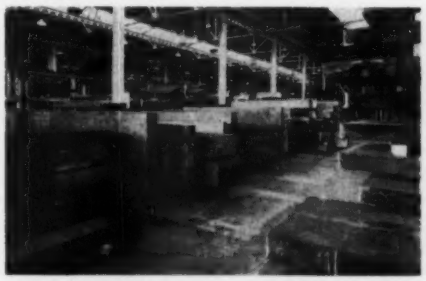
It's a basic reason why purchasing agents who *depend* on local sources call Crucible *first* – like this one:

"We're basically a tool and die 'job' shop. We never know what steel we'll be using from one day to the next. So whatever we need, we need fast. It has been our experience that it saves time to call the Crucible warehouse first."

Why not simplify and speed up your specialty steel purchases by relying on your local Crucible warehouse? The advantages of Crucible's entire integrated operation, from mining the ore to steelmaking and warehouse delivery, are all available through the nearby source. *Crucible Steel Company of America, Dept. PJ06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



Local warehouse can fill both large and small orders from stocks like these of hollow tool steel sections and solid rounds.



Die casting die steels and plastic mold steels stand ready for cutting to order and immediate delivery.

Most Crucible warehouses stock stainless bars — stack them upright in "A" racks to protect the surfaces.

TOOL STEELS – Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS – Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el® rounds, hexagons, plates and brake die steel

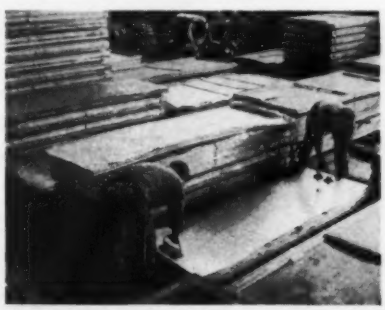
ALLOY STEELS – Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS – Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL



Need stainless sheet? The local warehouse stocks most types, finishes and sizes for prompt delivery to you.

HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

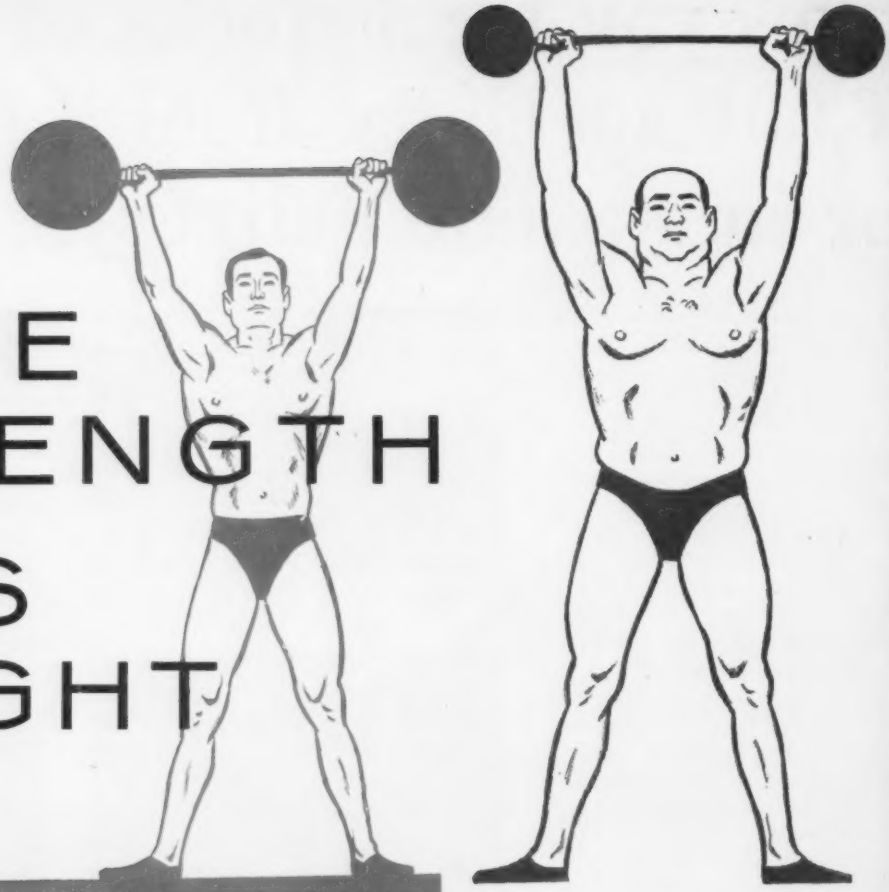
– and many others

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

CRUCIBLE STEEL COMPANY OF AMERICA



MORE STRENGTH LESS WEIGHT

specify

A. W. DYNALLOY

A. W. DYNALLOY Steel provides higher strength per unit of weight . . . lets you cut weight in fabricated products.

Specify DYNALLOY and realize these additional advantages: weldability, easy formability and resistance to corrosion and impact. In products where high strength and low weight are desirable, DYNALLOY will provide you with a means to higher quality production . . . lower costs . . . increased profits. Call your Alan Wood Representative today! He's always available and ready to help.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN • PENNSYLVANIA

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Montreal, Toronto and Vancouver, Canada—A. C. Leslie & Co., Limited

Lima Type 24-T Jobmaster Truck Crane handling scrap in yard of Buckeye Foundry, Cincinnati, Ohio. The versatile crane is equipped with a 28-ft. boom and employs a hook, ½-yd. clamshell, or 3000-lb. magnet, depending on the job.

"LIMA Jobmaster saves 20 man-hours on just one car-unloading operation" *reports Buckeye Foundry, Cincinnati, Ohio*

Buckeye Foundry, manufacturer of castings for the machine tool industry, bought a Lima Type 24-T Jobmaster Truck Crane in mid-1957 to speed up materials handling.

Al Huth, plant maintenance engineer, says: "We use the crane for handling pig iron, sand, scrap and flasks, and it has proved to be a very profitable investment. Formerly the materials-handling jobs were done by a crew of 18 men, and it was a lot of hard, brutal work 8 hours a day. Now the crane works only 7 hours a day, and our work force has been reduced to four men. The crane can unload 300 tons of pig iron a day, or 60 to 65 truckloads of sand. It used to take three men 8 hours to unload a carload of sand. With the Lima, it now takes two men 2 hours to do the same job. Unloading a carload of pig iron previously meant two men for 8 hours. With the Lima, it now takes only two men 1 hour."

If you have a materials-handling problem, it will pay you to check the complete line of wagon, truck and crawler-mounted Limas . . . designed and built with the quality that saves you time and money on every job. See your nearby distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

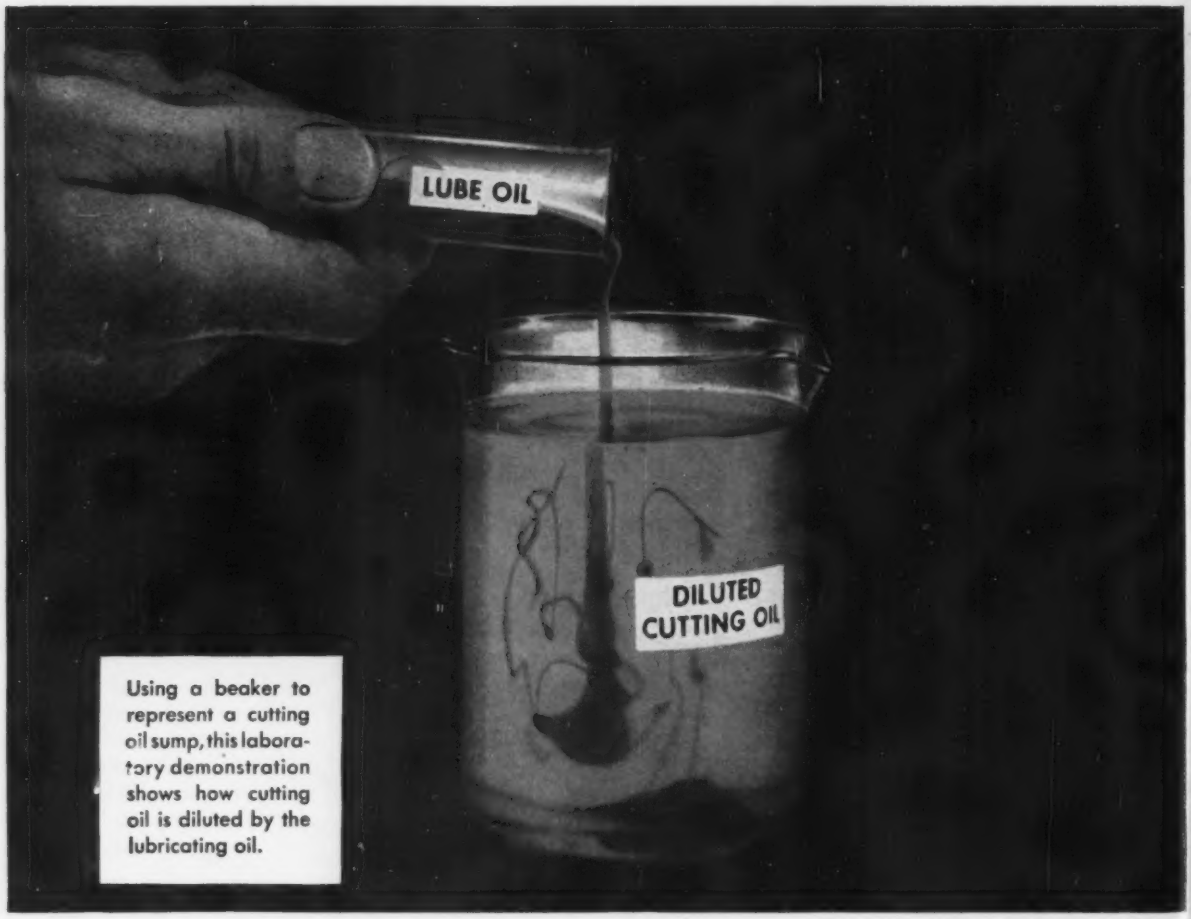
LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

598

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON



Using a beaker to represent a cutting oil sump, this laboratory demonstration shows how cutting oil is diluted by the lubricating oil.

Diluted cutting oil can cut output 33%

No matter how careful your lubricating techniques, you still can't stop lube oil from leaking into the cutting oil sump on 70% of automatic screw machines. As cutting oil is diluted, it loses strength—ingredients that make it efficient become less and less effective. The natural consequence is shortened tool life, more downtime and a higher percentage of rejects.

Texaco Cleartex can end this problem forever. All you have to do is use Cleartex for both cutting *and* lubrication . . . and watch your production rise. The exceptional chemical stability and load-carrying ability of the Cleartex series make them equally suitable for use as cutting oils, lubricants and hydraulic fluids. (70% of all automatic screw machines can benefit from the "Cleartex Cure!")

TAKE THE CLEARTEX CURE SOON!

Write today for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This new illustrated guide will fill you in on the details, show you where you may be losing profits and how to avoid it . . . Or contact your local Texaco Lubrication Engineer soon for an authoritative survey of your automatics. Just call the nearest of more than 2,300 Texaco Distributing Plants, or write to Texaco Inc., 135 East 42nd Street, New York 17, New York. Dept. IA-FM-13.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

"What you don't know about grinding wheels makes an important difference"

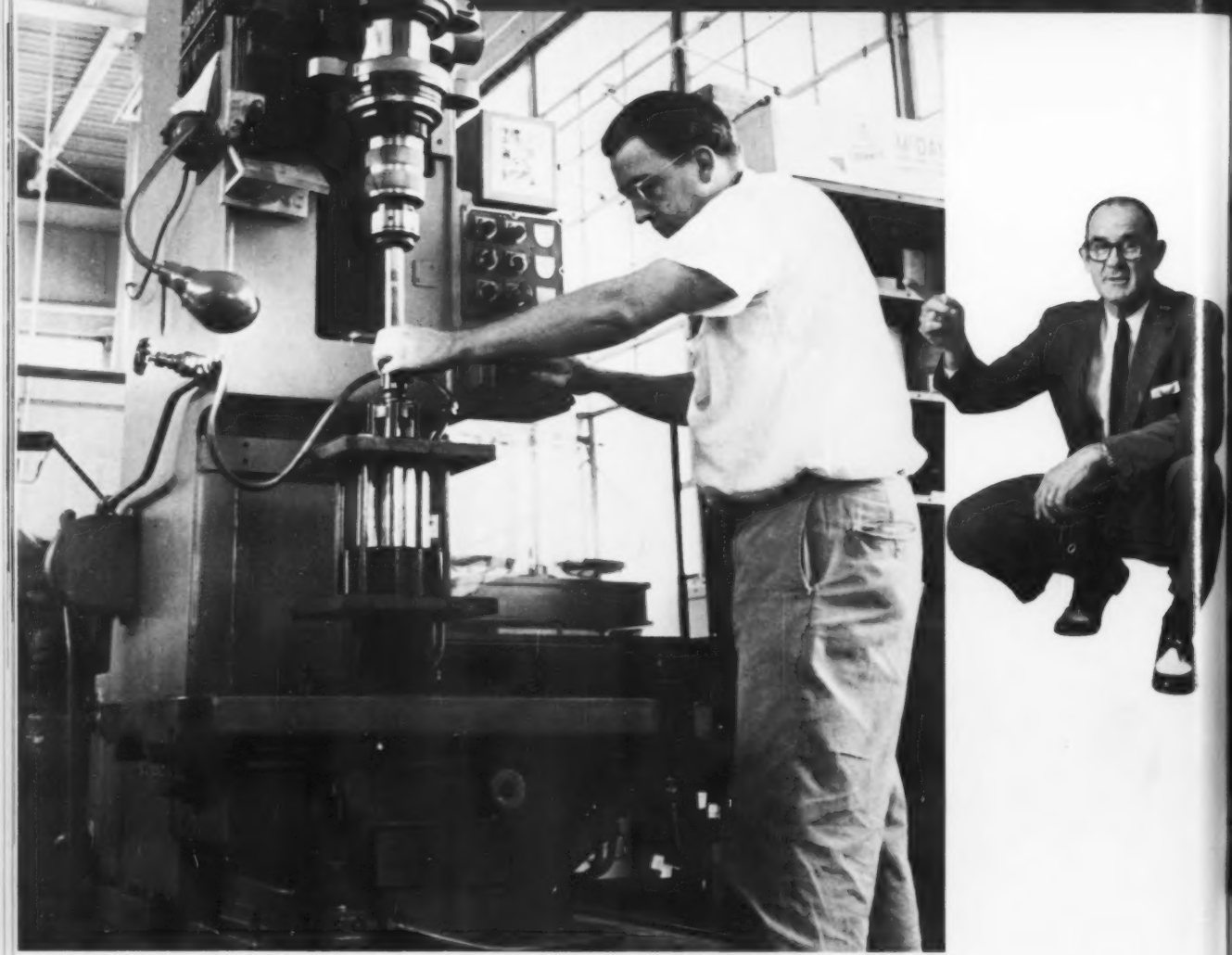
Elden L. Auker, Marketing V. P. of Bay State Abrasives, is a man who knows the industry through years of experience both in working in the field with Bay State customers and from close association with the research and development programs at Bay State's manufacturing headquarters in Westboro, Mass.

"It's a sad but proven fact that all grinding wheels are *not* the same... even when they *look* the same and, in many cases, even when they have the same general specifications.

"The fact that many of our wheels are safer, faster-cutting and more efficient than their competitors is a tribute to our research and development people... who have led the world in such important abrasive developments as REINFORCED RAISED HUB DISC-WHEELS, GRIT-CLOTH, HIGH SPEED SNAGGING WHEELS, DURACUT...and whose latest developments promise to give even greater reality and meaning to our long-established 'Wheels of Progress' trademark.

"To show you specifically what I'm talking about, let's take a look at some of the current research and product quality projects under way at Westboro..."

NEW IDEAS, NEW TECHNIQUES for better grinding at lower cost...



"A completely new approach to the manufacture of honing stones is in the works. It starts with a unique, atmosphere-controlled kiln which promises more perfect uniformity of honing stone performance than has ever been possible before. The process winds up with tests under actual production conditions, as shown above. Technician Arthur Taylor is running a vertical honing machine which is one of the very few such test machines—and may well be the only one—devoted solely to research use by an abrasive manufacturer. Tests run on this machine show up the smallest weaknesses and inconsistencies of texture, stone-hardness, etc., and these are weeded out so that production stones are uniform in every respect."

BAY STATE

BAY STATE
WHEELS of PROGRESS

"Better grinding at lower cost to you—that's our business . . . and that's what you see in the making here on these pages. We start with good ideas . . . but only the best ever pass our ruthless tests."

Edw L Auker

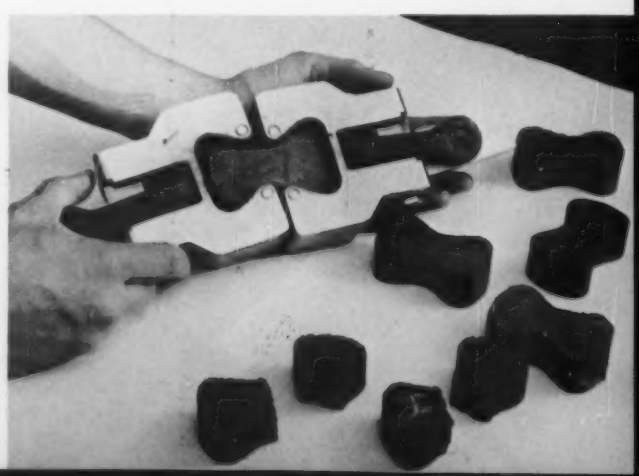
BAY STATE VICE PRESIDENT, MARKETING

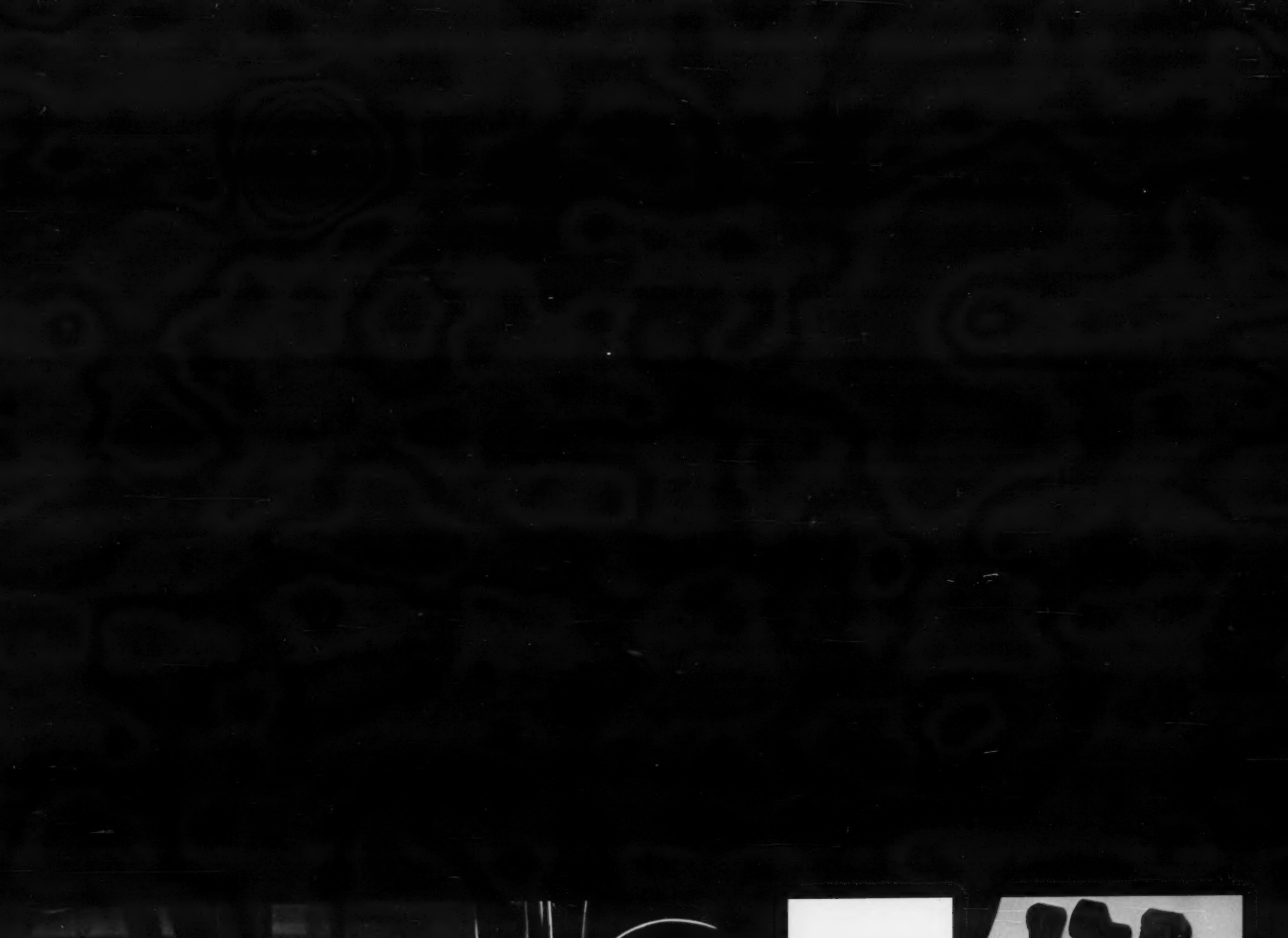
"Sure, thermal tests are unspectacular but they're brutal just the same. Here a snagging wheel is placed in a heat chamber and peripheral surface is heated just as it would be in normal use . . . only more severely, by far. Thermocouples are imbedded into the side surface and here you see James McElroy checking the temperature gradient from periphery to center. Extreme differential between outer and inner temperatures eventually cracks wheels and only formulations with outstanding resistance to thermal cracking are ever put into production."

"Our vacuum mixing is a very critical process and Bay State leads in designing production machinery that ensures completely bubble-free material for honing stones. High vacuum in the mixing chamber forces even tiny bubbles out of the mix and rigid temperature control further guarantees uniformity of consistency. A technician is shown here pouring abrasive grain into the mixer preparatory to adding fluid bond material."

"Breaking the sound barrier? Well, you might think so when Bay State's new hot-pressed, high-speed snagging wheels are tested to destruction. Locked inside a huge steel drum, the big wheels are whirled at ever-increasing speed until they literally explode under the tremendous centrifugal stresses imposed. No wheel is put into production unless tests prove that it has at least a 4 to 1 safety factor. Bay State snagging wheels are now safety-rated at higher speeds than current grinders can produce. That's technician Clement Gareri removing shattered fragments of a wheel that burst into smithereens at one of the highest surface speeds ever recorded in the industry."

"Tensile strength, plus! Figure-eight briquette samples of snagging wheel material are gripped in steel jaws and placed in a machine capable of exerting a direct pull of 50,000 lbs. Under the monstrous tensile loads imposed, even rock-hard snagging wheel material stretches before it breaks and the tests immediately show up formulations that resist tensile loads most effectively . . . and are therefore safest for use."





"Ind
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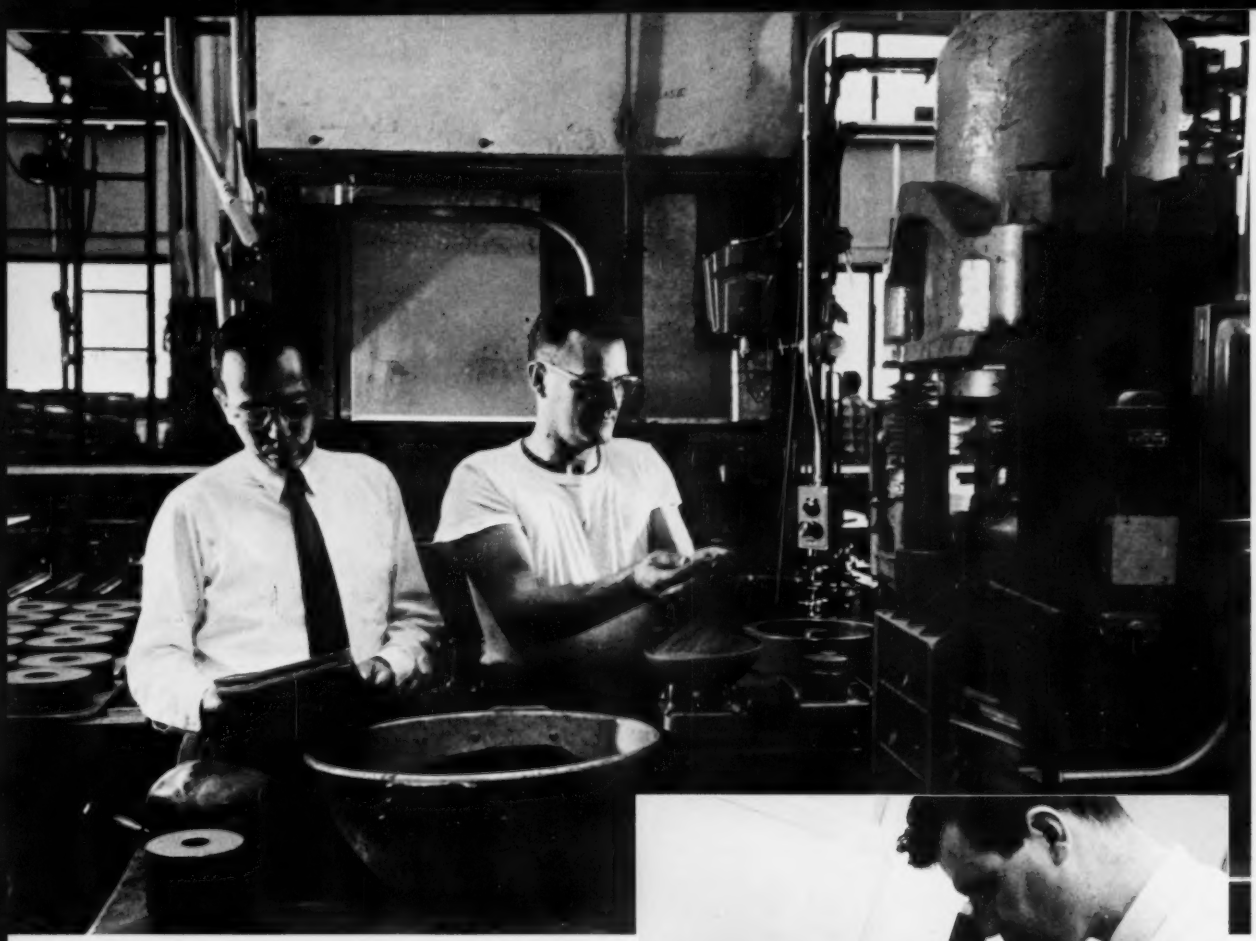

"Increased automation of vitrified wheel production helps speed up customers' orders by eliminating many time-consuming steps. Conveyors deliver mix to the press line where each press has its own, automatic drying oven. Here, Factory Superintendent Richard Thompson checks the formula and other special instructions for a particular job as operator Henry Bouvier carefully weighs out the correct amount of mix. That's the drying oven in the background and the press at right. This largely automated set-up is virtually unique in the industry."

"Petrographic Microscopy may be a jawbreaker but it's vital to effective grinding. Research Ceramist Irvin Havens here checks the relationship between abrasive grain and bond in a very hard wheel. Another project of his is to determine the importance of grain *shape*. If sufficiently improved performance can be gained by sorting abrasive grains for shape as well as size . . . Bay State wheels of the future will incorporate this additional refinement."

"What's a Sonic Grader? It's an electronic nightmare as far as I'm concerned. But to an expert like Bay State's Manager of Quality Assurance, Roy Leaman, it's an extremely advanced but very worthwhile device that helps give Bay State wheels an extra edge over competition. The wheel is excited by a gentle tap and the resultant tone, or frequency of vibration, is picked up by the microphone (lower right). The operator compares this frequency with a series of electronically generated notes until he has a perfect match. The result gives a more perfect matching of wheel formulations, when re-orders of particular wheels are required."

"Bay State's **QUALITY CONTROL** programs mean better grinding at low cost for you!"

"Measuring the air flow through the side of a cut-off wheel gives us an accurate check on wheel density. This test, being conducted here by Quality Control Manager James Gilman and Louis Silvestry, is made after pressing but before baking. Twenty four carefully distributed check points are tested so that the entire wheel is covered.

To the best of my knowledge, we're the only grinding wheel manufacturer to have developed such an accurate and comprehensive density-test for cut-off wheels."

"'Samson's Hair' for reinforced disc-wheels?

What helps make Bay State disc-wheels so strong and so safe? It's the fiberglass reinforcement fabric, of course, but like Samson's hair, it has to be protected and one of Bay State's most jealously guarded secrets is the composition of the protective resin used for that purpose. This coating was the first and is still by far the best resin that successfully prevents crushing of the glass fibers during the manufacturing process. Here, Research Director Dr. H. Nathan Stone and Research Chemist Donald Grubba inspect a sample of fabric that has been removed from a *finished* wheel by burning away the bonding material in an electric furnace. The fibers are completely undamaged."

BAY STATE ABRASIVES

BAY STATE WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

beauty is stainless steel

Look for the beauty of Stainless Steel on your new automobile. Its bright finish will make your car look better, stay in style longer and have a higher trade-in value.

No other metal offers the freedom of design and fabrication, economy of care and the durable beauty that serves and sells like Stainless Steel.

McLOUTH STEEL CORPORATION, Detroit 17, Michigan

specify

McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

for automobiles

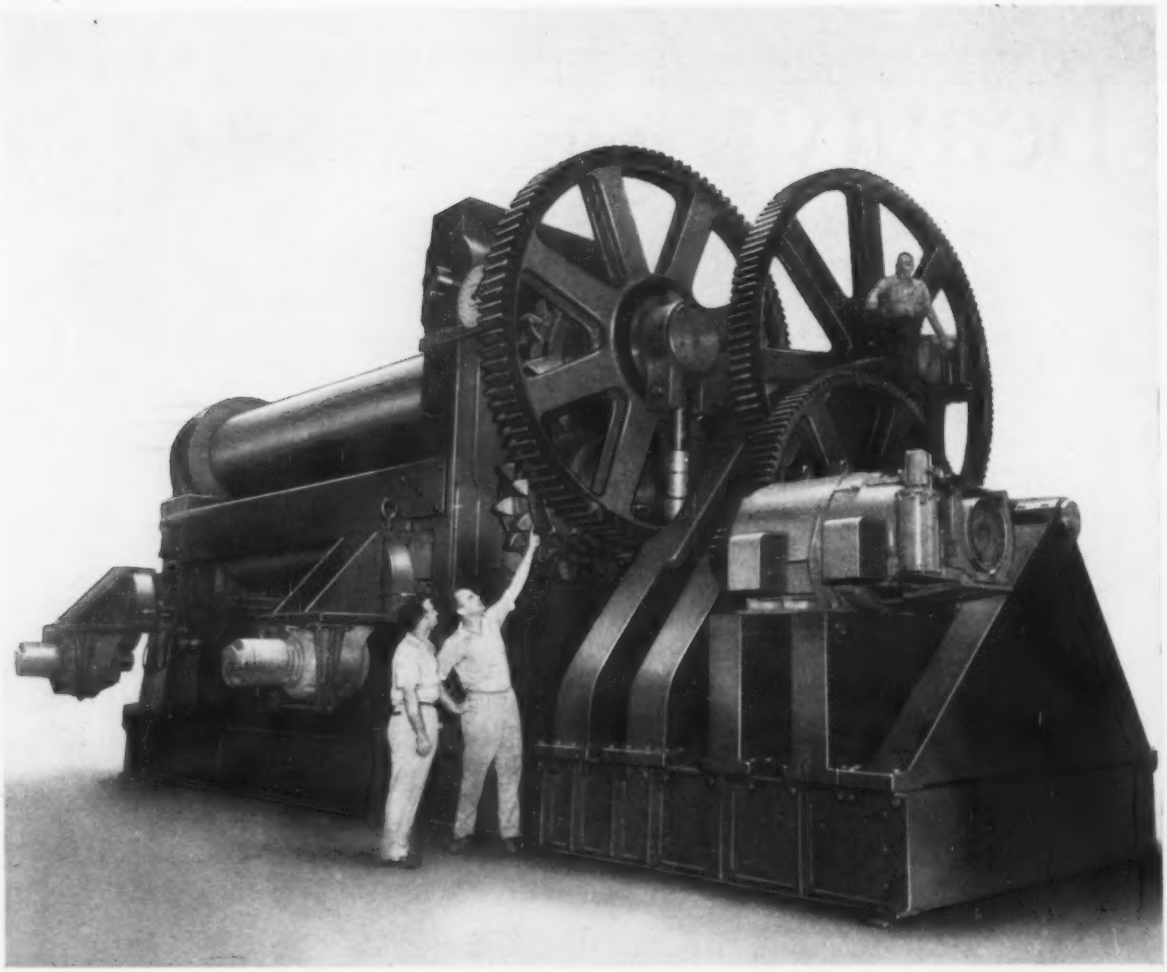

PLATE BENDING ROLLS
INITIAL PINCH TYPE

Capacity to 6 inch plate cold

THE LARGEST EVER BUILT

BERTSCH & COMPANY

CAMBRIDGE CITY INDIANA

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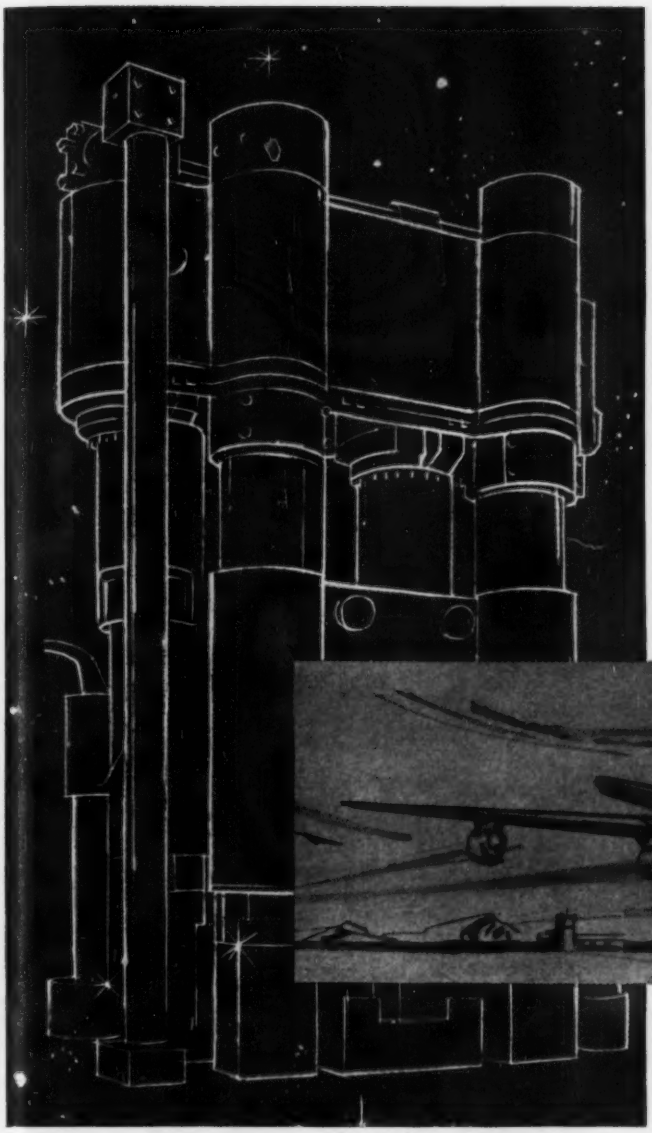
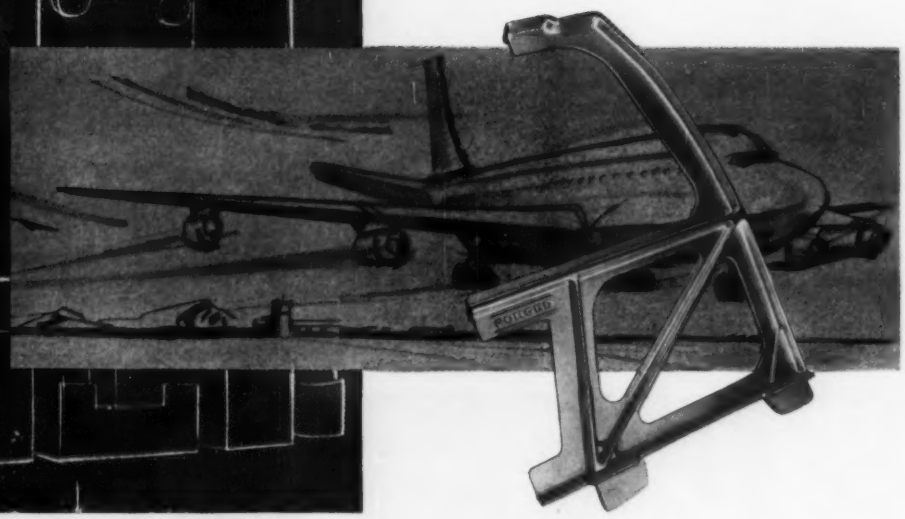


HOW FORGED PARTS help airplanes haul bigger payloads



In an airliner, every pound of weight saved is worth hundreds of dollars ... in revenue-making payload. And in military aircraft, pounds saved mean added miles-per-hour ... or added load carried.

In commercial products ... trucks, cars, materials-handling equipment ... the pounds of dead weight you eliminate by using forgings make money year-after-year for the operator. The forging process lets you put the metal exactly where you need it to carry the load, withstand shock or vibration, endure torsion. And with not a surplus ounce of non-working weight going along just for the ride.

Forged parts are the designer's friend ... strong where strength is needed, lowest in weight, twice-worked by original rolling of the best metals *plus* the hammer blows or high pressures of the forging process.

Write for literature to help you specify, design, and procure forged parts.

When it's a vital part, design it to be FORGED

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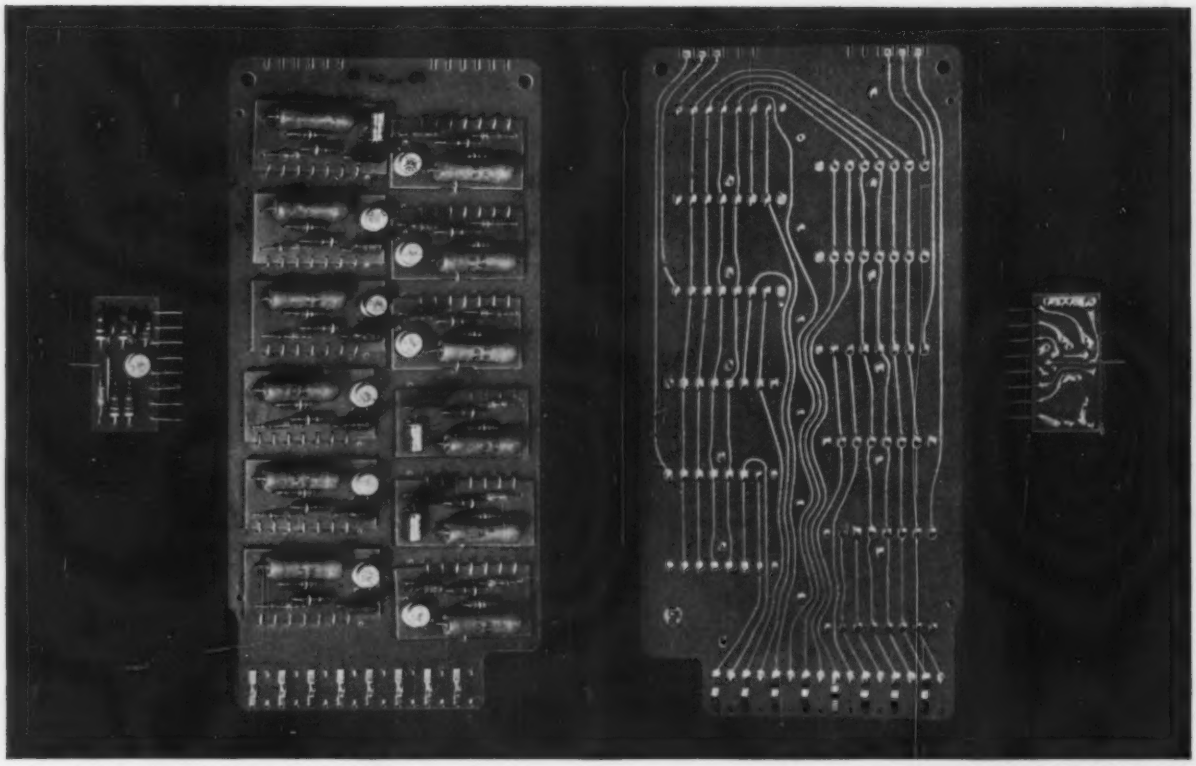
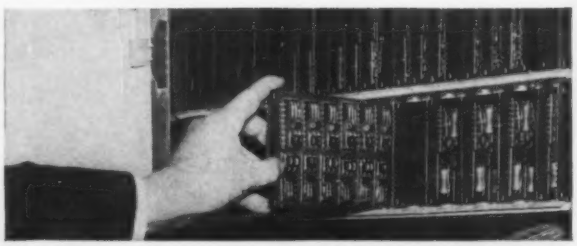
Names of sponsoring companies on request to this magazine

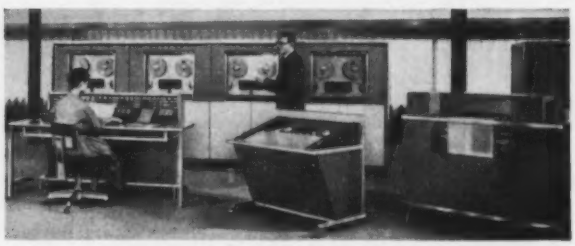


In the electronic logic elements of the RCA "501" data processing system, transistors and other small components are mounted on plastic wafers with printed-circuit wiring (small units right and left, above). The wafers, in turn, are mounted on thin plastic boards, also with printed circuits (center, above). This modular construction reduces size of the system by 75%, increases reliability, reduces maintenance.

PRINTED CIRCUITS OF COPPER AND ALL-TRANSISTOR DESIGN HELP MAKE 75% SIZE REDUCTION IN RCA DATA PROCESSOR



Modularized circuit elements are installed in the system by sliding them in place. Contacts on outside edge make possible quick checkout and testing without removing boards. Many thousands are used in each system.



The "501" is designed to handle paper work—bills, reports, payrolls, etc.—accurately, economically, and at extremely high speed. It serves businesses ranging from banks and utilities to steel mills.

With the growing importance of miniaturizat'on and reliability in electronics and nucleonics, Anaconda electrical copper products take new and varied forms—find new and more sophisticated uses.

In the compact new all-transistor data processing system shown above, the printed circuits are etched from Anaconda "Electro-Sheet" copper foil. This is electrodeposited paper-thin copper with quality carefully controlled to meet NEMA specifications. Bright on one side, it has a matte finish on the other for a firm bond to the circuit board. "Electro-Sheet" is furnished in various thicknesses to exceptionally close tolerances.

In other fields, the growing need for compact electrical assemblies which can handle high current densities calls for hollow copper conductors for fluid cooling. And for new environmental conditions, more difficult application needs, there are new copper alloys.

METALLURGICAL ASSISTANCE. Whatever your problem in electrical conductors, Anaconda metallurgical specialists will gladly help you select the metal—and the form or shape—best suited to your needs. See your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

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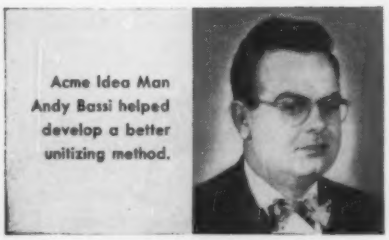
Pneumatic tools speed unitizing operation



Acme Idea Man Andy Bassi helped develop a better unitizing method.

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY, HAMMOND, INDIANA, uses pneumatic stretchers to unitize freight car roof sections. Their Acme Idea Man suggested to this leading company that pneumatic stretchers would increase the speed and efficiency of the strapping operation. (Idea U6-20)

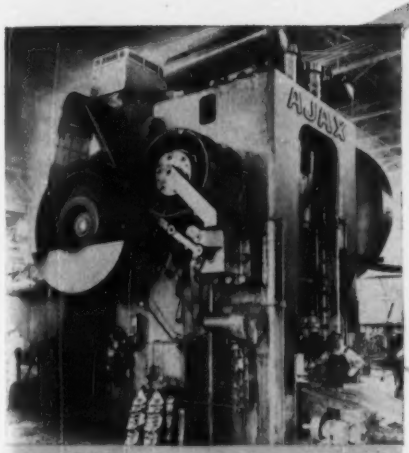
The pneumatic stretchers provide effortless, continuous strapping takeup to a pre-set, uniform tension. By tensioning steel strapping simultaneously around both ends of the units of roof sections, greater compression of the units can be obtained, enabling three of them to be loaded across the width of a gondola car. Strapping is used directly from the coil rather than in cut lengths, eliminating waste. The men find strapping quicker and easier to apply. Shipments move out of the plant faster, and arrive at their destination in excellent condition.

***Check Your Acme Idea Man.** His fund of knowledge may be what you need to help solve your materials handling or shipping problem. Call him at your nearest Acme Steel Office. Or write Dept. IFU-109, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 3, Ontario.

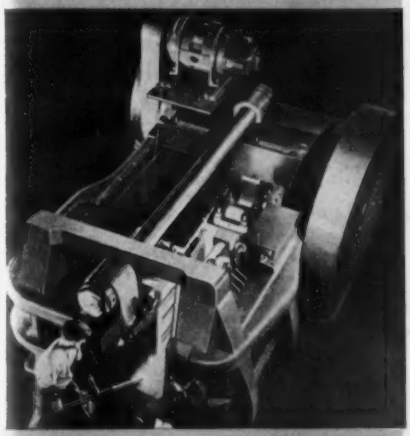
ACME STEEL **STEEL STRAPPING**

AJAX
FORGING MACHINERY

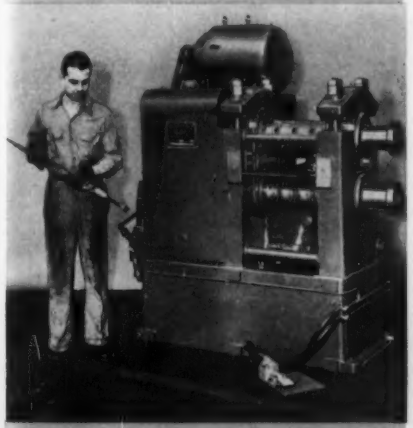
Engineered to forge more accurate parts with less machining



AJAX "HIGH SPEED" FORGING PRESSES



AJAX "AIR CLUTCH" FORGING MACHINES



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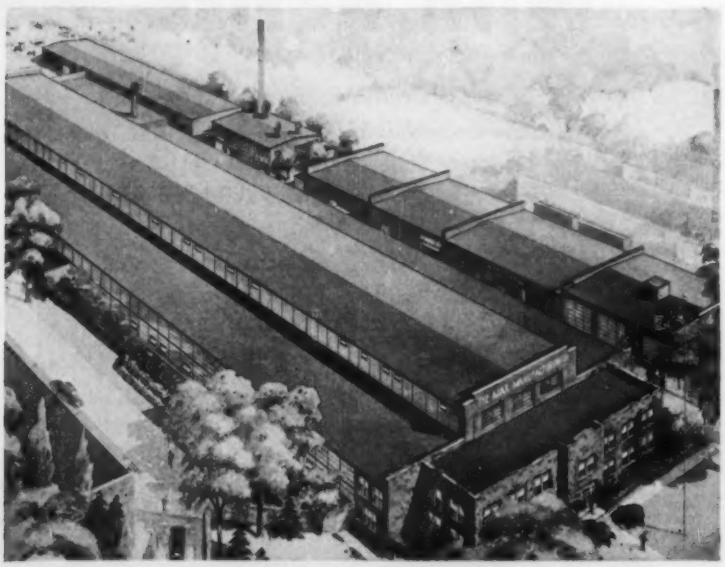
AJAX MACHINES are built with exceptionally rigid bed frames to assure excellent alignment and accurate die match.

SOLID STEEL FRAMES provide the maximum rigidity necessary for the production of uniform and accurate forged parts.

For a greater saving in material and machining costs . . . Specify AJAX Forging Machinery.



THE MODERN AJAX PLANT FACILITY EQUIPPED WITH THE LATEST IN MACHINE TOOLS TO BUILD THE BEST IN FORGING MACHINERY

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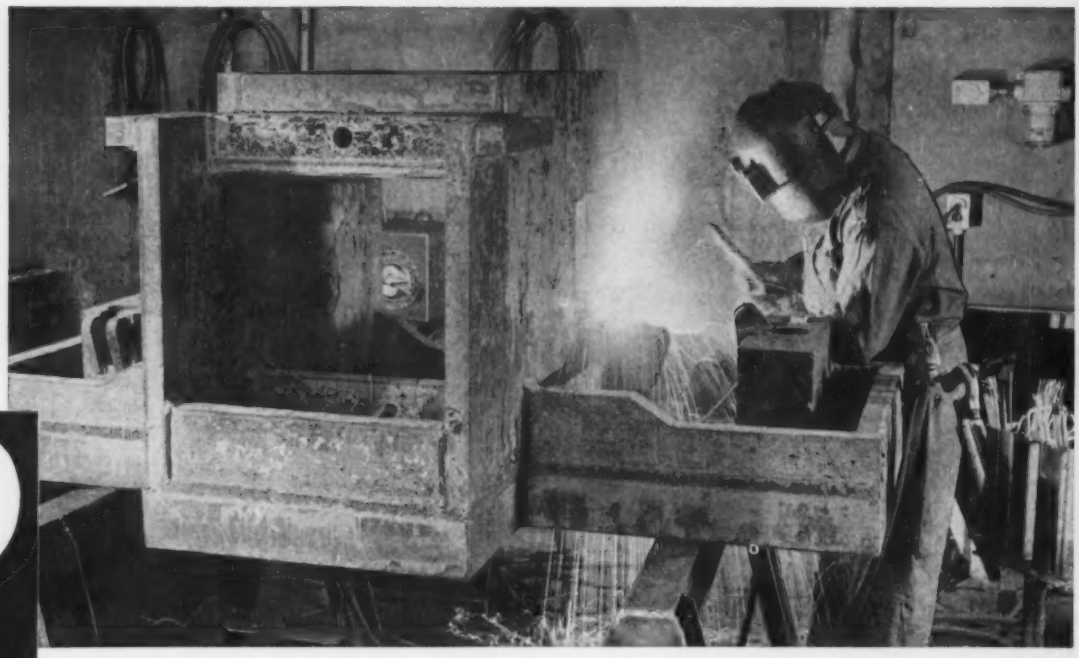
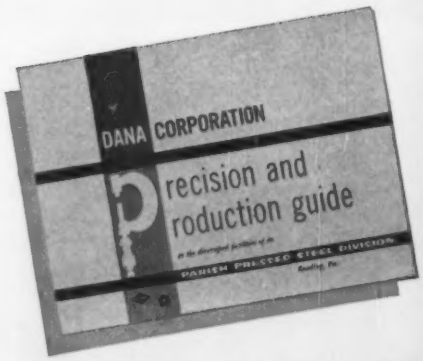


Cut YOUR Production Costs With Parish Weldments!

Parish has the overhead handling facilities, movable partitions and available floor space to handle *any* of your weldment jobs—and cut your production costs! For years Parish welders have skillfully handled jobs from one-of-a-kind to volume production in a wide variety of metals and alloys, ranging in thickness from forty-eight thousandths up to several inches.

At Parish every conceivable welding method is being combined with rigid engineering quality control to fabricate stronger, lighter, more accurate weldments—at lower cost to you.

Parish weldments completely eliminate the inherent danger of "blow holes" which often boost production costs of iron castings.



An illustrated booklet describes the diversified facilities available to you at Parish. Write now for your free copy.

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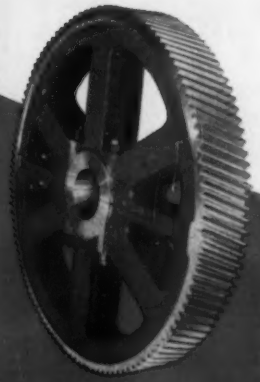

Back of every ILLINOIS gear is a tradition of dependability and superiority . . . a tradition that has become the priceless ingredient in the minds of men who specify, buy and use gears.

Wherever gears are used . . . the name ILLINOIS GEAR has become symbolic of a reputation . . . a matchless reputation that is known throughout industry and demonstrated by performance in all parts of the world.

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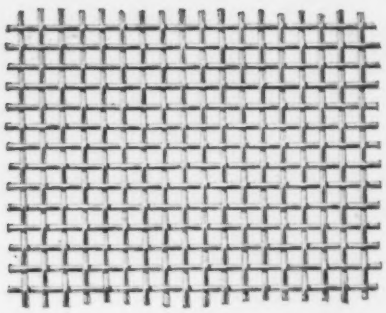
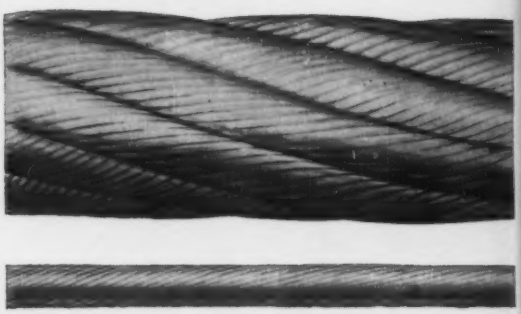
whatever you make in stainless steel wire

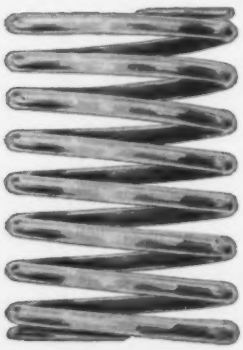


mesh

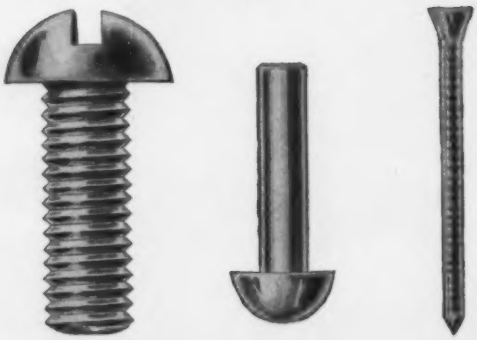


rope

springs



cold-headings



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Whatever you make in stainless wire, Allegheny Ludlum offers you adequate stocks of all standard grades for fast shipment. Special stainless steel wire on order.

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Write for your copy of Allegheny Stainless Wire, Illustrated 20-page booklet, which fully describes analyses, physical properties, corrosion resistance and principal applications of stainless wire.

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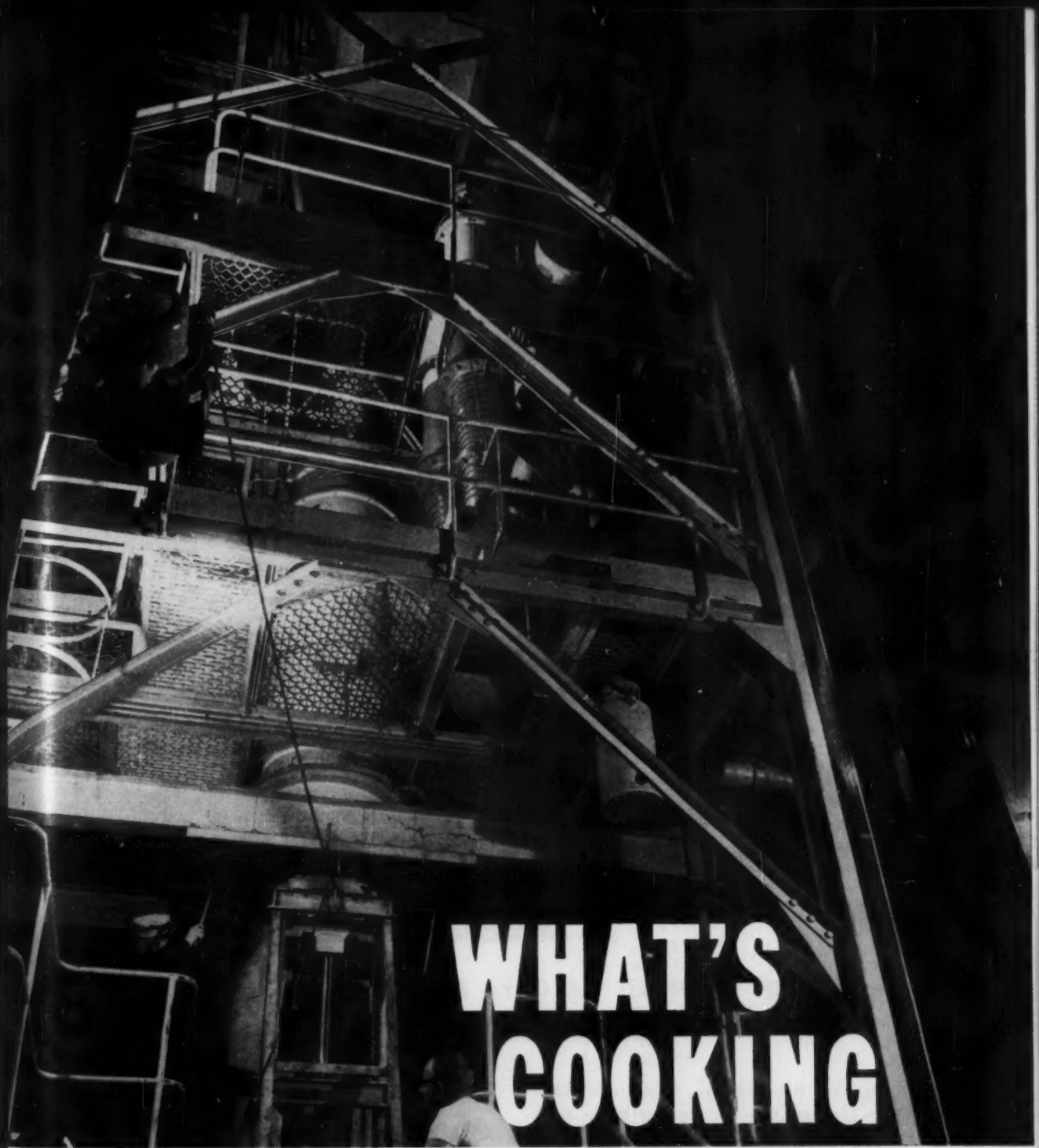

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There's a complete line of CEC arc furnaces to meet your vacuum melting needs, from laboratory to volume production.
WRITE for Bulletin 4-25.

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Kittanning Brick Company's Diesel-powered Plymouth hauls heavy loads of clay from mine to tipple. Mine-O-Motive unit pulls big loads with exceptional economy.

"7-ton PLYMOUTH Hauls 14 Cars Per Trip"

Reports Kittanning Brick Company, Adrian, Pa.

"Using a Plymouth Mine-O-Motive, we can now pull 14 cars or more from our clay working area to the tipple, with a crew of only 2 men," reports the president of Kittanning Brick Company, Adrian, Pa.

"The hauling efficiency provided by our Plymouth Diesel has enabled us to increase our daily clay production — saves us both time and money. Our system has improved employee morale and we always have empty cars to load, which reduces total man-hours per ton.

"Our narrow-gauge Model FMD hauls clay 48-hours a week over a 2-mile route, consumes only ½ gallon of fuel per hour. Four-gear shift enables it to pull a 14-car load over 6% grades with full power at all times."

For full information on a Plymouth designed to fit your haulage needs, send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-2, Plymouth, Ohio.

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WITH TORQOMOTIVE DRIVE

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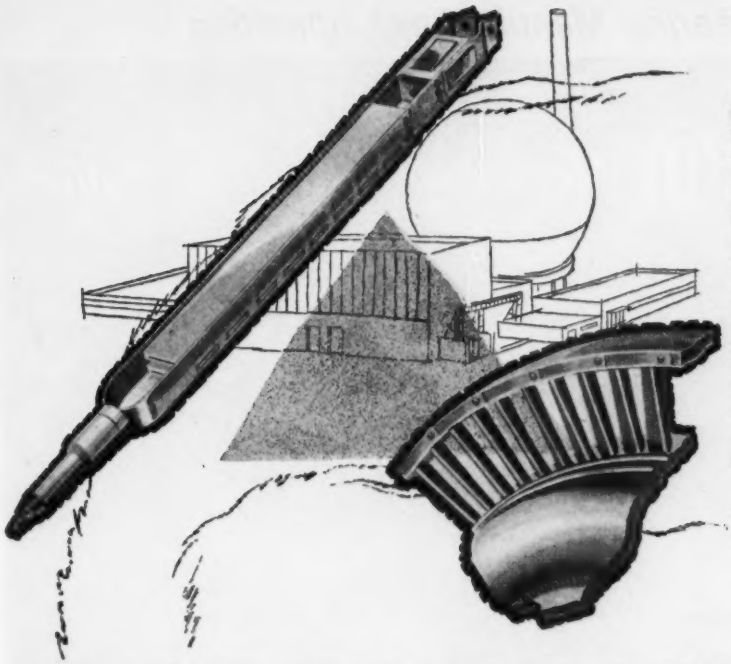
PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

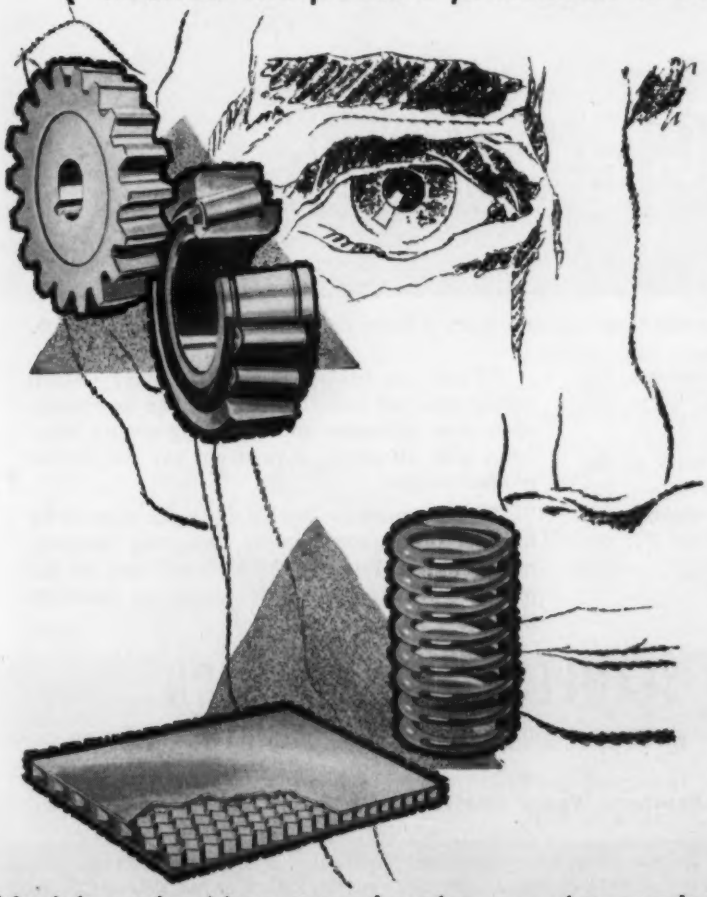


Today's metallurgical engineers and scientists are constantly meeting the challenge of sweeping technological advances. Electronic brains that solve "impossible" problems . . . jets and space craft which open brand-new horizons . . . reactors that produce fantastic amounts of nuclear energy. Advances such as these *demand* better metals . . . metals free of inclusions, with better electrical conductivity, increased hot strength, extended creep resistance and fatigue limits. In turn, better refractories are a "must" in order to precisely control purity and composition during the development of these metals.

Metal processors have long relied on the wide range of Norton Refractory products to precisely meet their re-

Dynamic Achievements With Purer Metals

..reflect the positive protection of Norton Refractories



quirements. High purity (99.5%) ALUNDUM* aluminum oxide, outstandingly stable to both oxidizing and reducing atmospheres . . . dense, fused, stabilized Zirconia for operations requiring an inert refractory for extremely high temperatures . . . nonwetting, nitride-bonded CRYSTOLON* silicon carbide...low boron MAGNORITE* magnesium oxide, ideal for vacuum melting. In addition, the Norton Man is constantly helping in process and product development. Backed by Norton Company's extensive engineering facilities, he can offer time and money-saving advice on all refractory problems.

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Automotive Power Steering Manufacturer Specifies

OSTUCO *Mechanical Seamless Tubing*

FOR SURFACE FINISH

Cold drawing Ostuco tubing through precision ring die on cold draw bench at Shelby mill. Mandrel controls and sizes I.D.

"Automotive components are our business. We have produced literally millions. And we're still learning every day.

"One of the lessons we learned early in the game is that you can't beat Ostuco tubing for surface finish. It cuts our machining costs, keeps us on top competitively.

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To learn more about what Ostuco tubing can do for *your* production, contact your Ohio Seamless representative, listed in the Yellow Pages, or the mill at *Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.*

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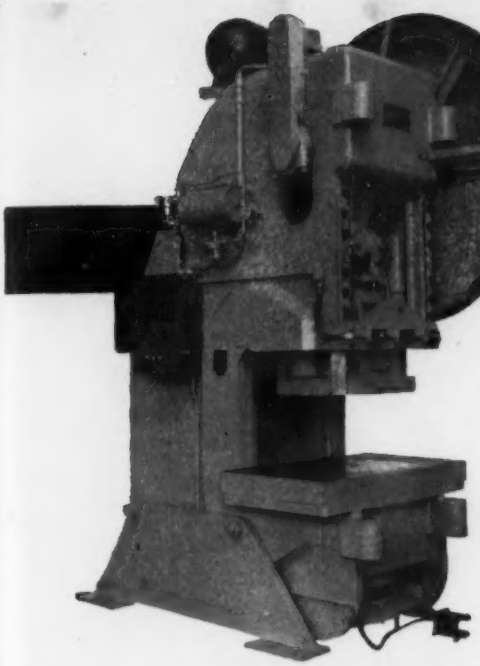
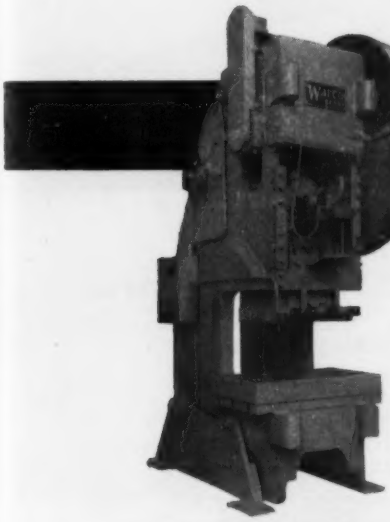


200-ton standard

Warco®

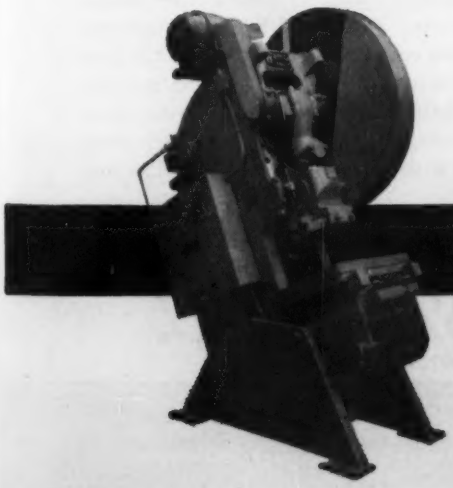


150-ton with power slide adjustment

the OBI line with the built-in extras...

Warco—Quality Press Line—gives you *all* these "extras" in an OBI press: welded steel frame of plate much stiffer than cast iron or Meehanite; pneumatically operated combined friction clutch and spring-loaded brake; saddle type connection; long, hand scraped gib ways; heat treated crankshaft; high grade steel gears with heat treated pinions; and rotary type limit switches for press control.

Before you buy any OBI, compare and you'll buy Warco. They're available in capacities from 40 to 200 ton.

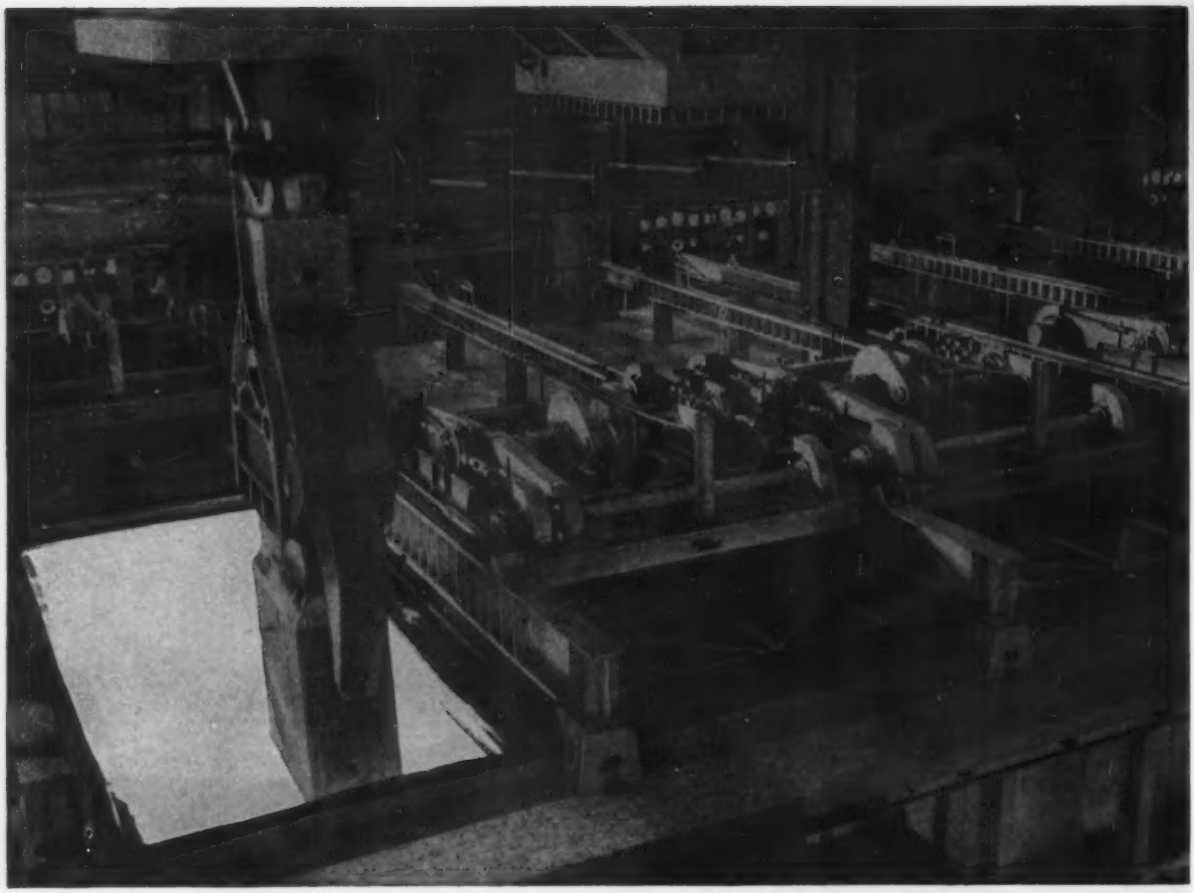


60-ton standard OBI inclined position

The Federal Machine and Welder Company
Warren • Ohio

Federal® WELDERS

Warco® PRESSES



As more and more steel companies expand they specify SALEM Soaking Pits

When steel companies require new soaking pits to heat ingots for rolling, more and more they are specifying Salem. One steel company operating official recently said, "The previous installation heated more steel ingots ready for rolling with less fuel consumption, less maintenance cost and better temperature uniformity than any other type of pit in our plant, so we have again turned to Salem-Brosius." The recently completed pits shown above are good examples of Salem-Brosius' advanced design. They are of the 2-burner, single-end top-fired type, fitted with needle-type metallic recuperators and *capable of placing 200 tons of steel under cover per pit.*

Good performance reports are typical . . . not only concerning soaking pits, but all other Salem-Brosius heating and heat-treating furnaces. Salem-Brosius engineers are well known for their ability to design furnaces for maximum uniform output at minimum operating cost. If your plans call for replacing old furnaces or adding new ones, why not ask us to bid? There will be no obligation.

SALEM-BROSIUS, INC.
PITTSBURGH, PENNSYLVANIA

Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania.

For a money-saving balance

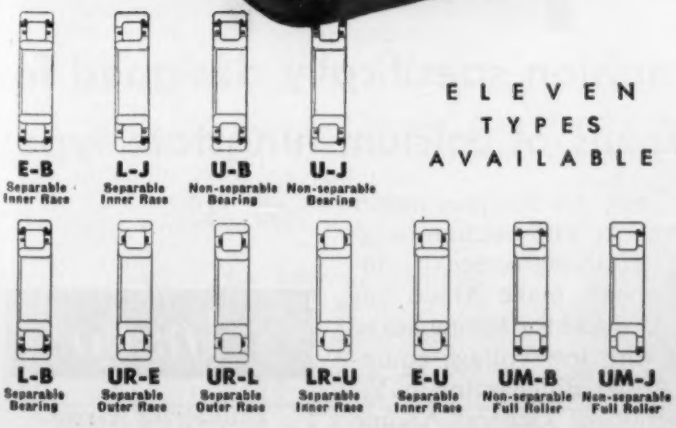
between maximum performance and moderate cost . . .

ROLLWAY Tru-Rol® BEARINGS

Give you more for your bearing dollar

For those hundreds of in-between applications where performance requirements are more exacting than those provided by the ordinary commercial bearing, but where maximum precision would be unneeded precision – specify Tru-Rol for the job.

Tru-Rol Bearings provide above-commercial-grade efficiency . . . at worthwhile savings in cost. Internal clearances are closely controlled. Rollers are equally spaced to eliminate- out-of-balance vibration. Each roller is crowned to distribute the load evenly along the full length of the roller. Eleven types available in single and double width bearings, in stamped steel retainer, segmented retainer or full roller construction.



ELEVEN TYPES AVAILABLE

Ask your nearby Rollway Service Engineer to detail the quality you *should be getting* in your "commercial grade" bearings. Or write for the Rollway Tru-Rol catalog showing the full line, and capacity and size ranges. ROLLWAY BEARING COMPANY, INC., Syracuse, N. Y.

ROLLWAY® BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ENGINEERING OFFICES: Syracuse • Chicago • Toronto • Cleveland • Seattle • San Francisco • Boston • Detroit • Pittsburgh • Houston • Philadelphia • Los Angeles

NEW

Ansco Superay 'D'

An ultra-speed x-ray emulsion specifically designed for use with intensifying screens of calcium tungstate types

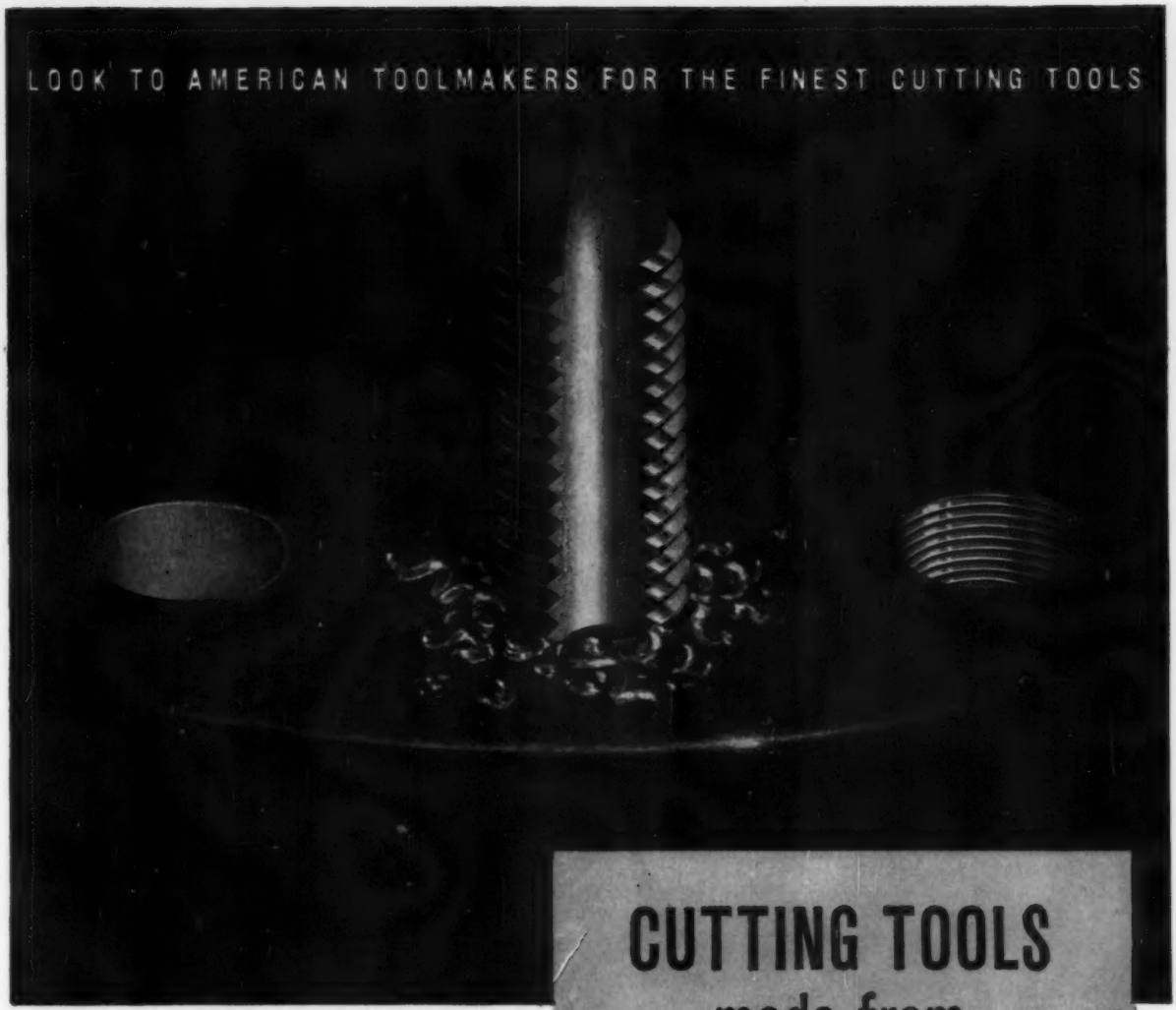
Here at last is an all new fine grain film that has extremely wide latitude when exposed either by direct x-rays or with lead screens.

Try this superb new film and see the consistently superior results in flaw detection through specimens having a wide range of thicknesses. All this plus higher performance with calcium tungstate intensifying screens to increase speed, make Ansco Superay 'D' ideal for testing heavy metals with low voltage equipment. Ansco, Binghamton, N.Y., A Division of General Aniline & Film Corporation.

Ansco

Industrial X-ray

LOOK TO AMERICAN TOOLMAKERS FOR THE FINEST CUTTING TOOLS



CUTTING TOOLS made from HIGH SPEED STEELS *are Better Than Ever*

Today's high speed steel tools for tapping, drilling, milling, broaching, reaming, sawing and other metal cutting operations are better than ever. Through research and development, and new and better production methods, American toolmakers are constantly improving high speed steel tools to help you make better products . . . at less cost.

As a leading producer of high speed and other specialty steels, Universal-Cyclops continues to aid your toolmaker's efforts with its own aggressive research and development program.

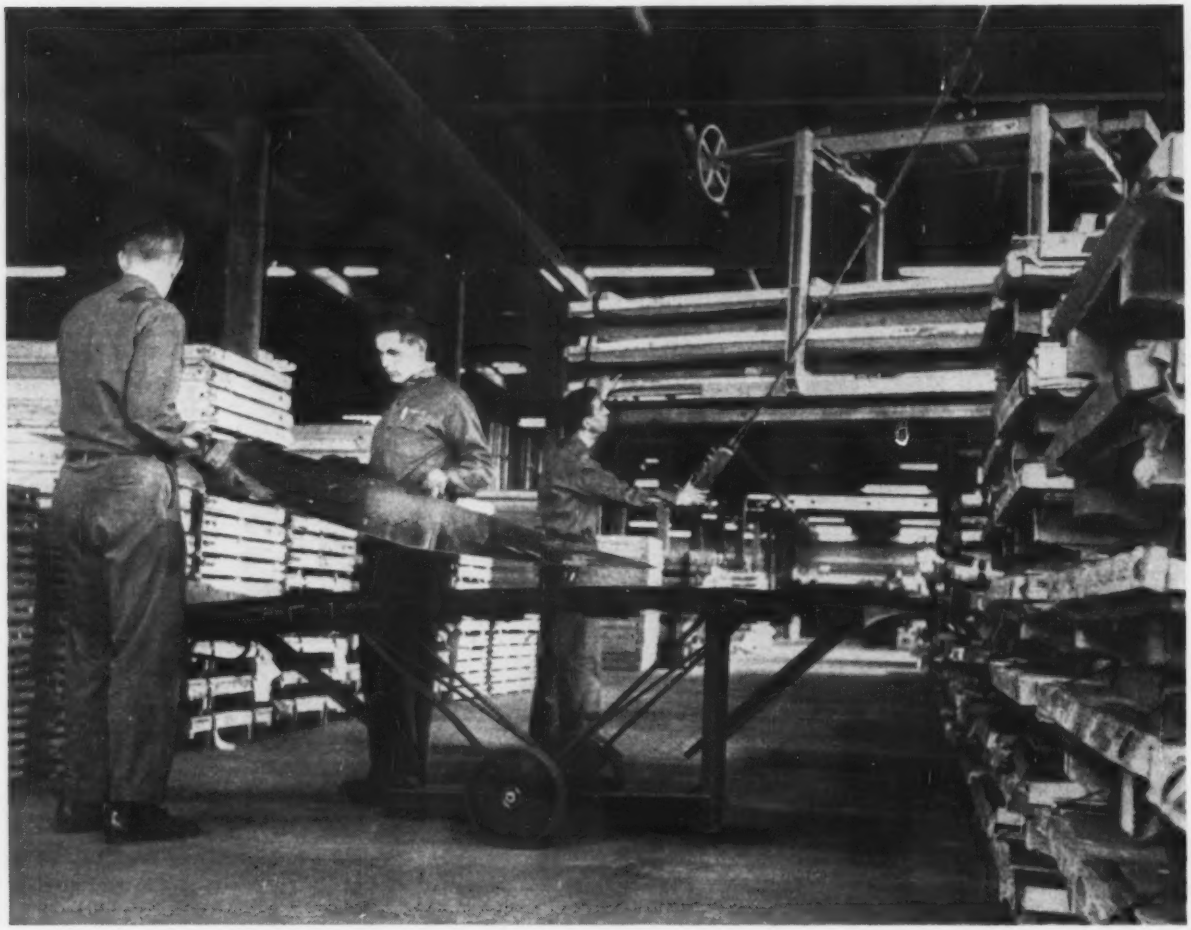
Look to your American toolmaker for the finest in high speed steel cutting tools!

UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
BRIDGEVILLE, PA.

TOOL STEELS • STAINLESS STEELS • HIGH TEMPERATURE METALS

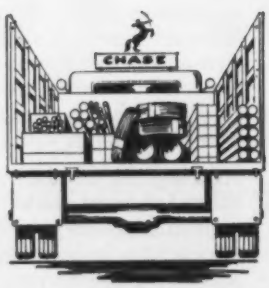
CHASE SERVICE

IN ALUMINUM • BRASS • COPPER • STAINLESS STEEL



BEST WAY TO KEEP YOUR DOLLARS WORKING!

Turn to Chase for local service to meet your needs for aluminum, brass, copper and stainless steel. The Chase warehouse flexible service keeps your dollars from being tied up.



And you get all these advantages:

- Save storage space
- Reduce handling costs
- Tie up less money in inventory
- One source buying—single order, single bill
- No long term capital investments
- Buy as need develops
- Expert metallurgical service available, backed by Chase Mills
- Free your valuable storage space for more productive use

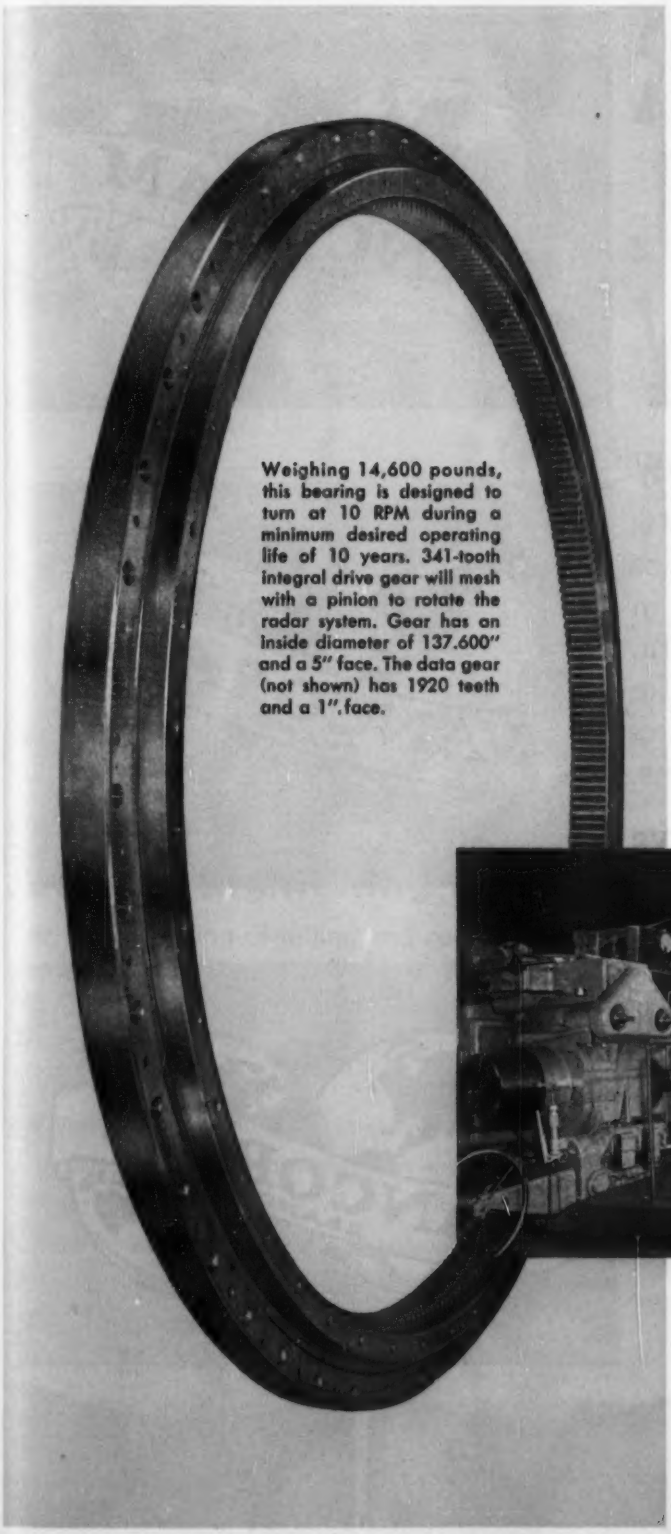
All these advantages are on tap at your nearest Chase warehouse. Tell us your needs for specialty metals. Give Chase service a try.

Chase BRASS & COPPER CO. WATERBURY 20, CONN.
Subsidiary of ***Kennecott Copper Corporation***

THE NATION'S HEADQUARTERS FOR ALUMINUM • BRASS • BRONZE • COPPER • STAINLESS STEEL AND FORGINGS

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis New Orleans New York-Newark Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

Huge bearing for Nike-Zeus radar system incorporates Farrel® precision internal gears



Weighing 14,600 pounds, this bearing is designed to turn at 10 RPM during a minimum desired operating life of 10 years. 341-tooth integral drive gear will mesh with a pinion to rotate the radar system. Gear has an inside diameter of 137.600" and a 5" face. The data gear (not shown) has 1920 teeth and a 1" face.

The largest precision ball bearing ever fabricated—13'9" in diameter, with 88 four-inch balls—has recently been completed by the Kaydon Engineering Corp. Designed to carry a rotating dead weight of up to one million pounds, it will be used in the supporting pedestal of a Nike-Zeus radar system.

Drive and data gears were cut by Farrel to very close tolerances. These were made integral with the bearing to eliminate the accumulative errors inherent when a number of parts are pieced together, and to simplify the design.

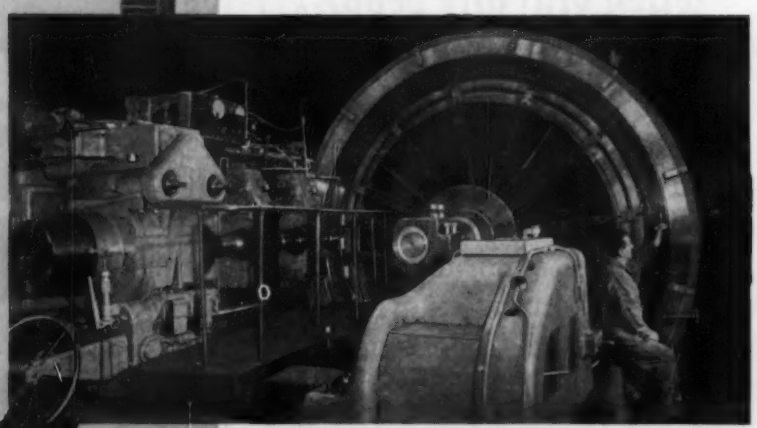
The Farrel generator on which the gears were cut combines the capacity to handle work of such proportions with the precision demanded for this application. Farrel internal gears are available with spur or single-helical teeth in sizes up to 23'0" external blank diameter, 20" face, ¾ DP.

Ask for details of large gears to meet your requirements.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia & Derby, Conn., Buffalo & Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Los Angeles, Salt Lake City, Tulsa, Houston, Atlanta
European Office: Piazza della Republica 32, Milano, Italy

FARREL



Generating a precision internal gear, similar to the one supplied to Kaydon in a Farrel gear generator.

FB-1172

WATCH FOR THIS SYMBOL OF QUALITY

...AT THE METAL SHOW

in Chicago's Amphitheatre, Nov. 2-6. This familiar trademark identifies Vanadium Corporation's exhibit in Booth 640. Don't fail to stop in. You'll meet old friends there, make new ones and learn about new ferroalloy developments and applications.

...WHEN YOU BUY FERROALLOYS

The well-known "worlds" symbolize the superior quality of Vancoram Products and also represent VCA's reputation for prompt, efficient service and technical assistance. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit Pittsburgh

VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

Cold straightening machines

for straightening of tubing and round bars — vertical design

- Maximum accuracy and speed operation
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- Vertical arrangement of rolls ensures constant position of lower tube surface with simple design of inlet and outlet channels
- Very simple adjustment and operation, full view of material during straightening process
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...igns, speeds and ... readily adapted to ... individual requirements.

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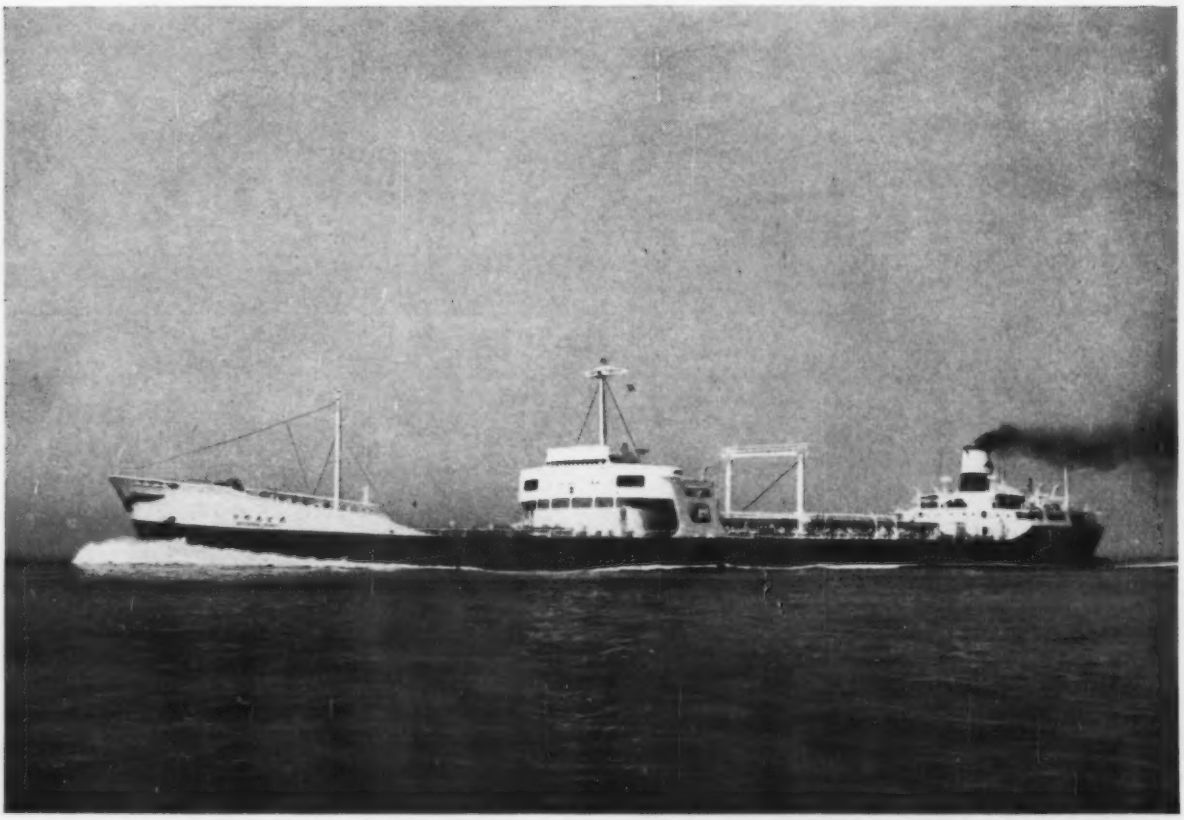
NKK-STEEL, PIPES & SHIPS



Tankers built by NKK with NKK's steel carry oil produced with NKK's pipes

NIPPON KOKAN's capacity to produce from iron ore an astonishing variety of high-quality products assures customers that the most exacting requirements will be promptly and faithfully met.

Principal Products:
Tubular Goods—Bars & Shapes—Plates & Sheets—G. I. Sheets—Pig Iron Ferro-Alloys — Coal Chemicals — Fertilizers — Refractories — SHIPBUILDING — SHIP REPAIRS — INDUSTRIAL ENGINEERING

NKK

NIPPON KOKAN K.K.

(Japan Steel & Tube Corporation)

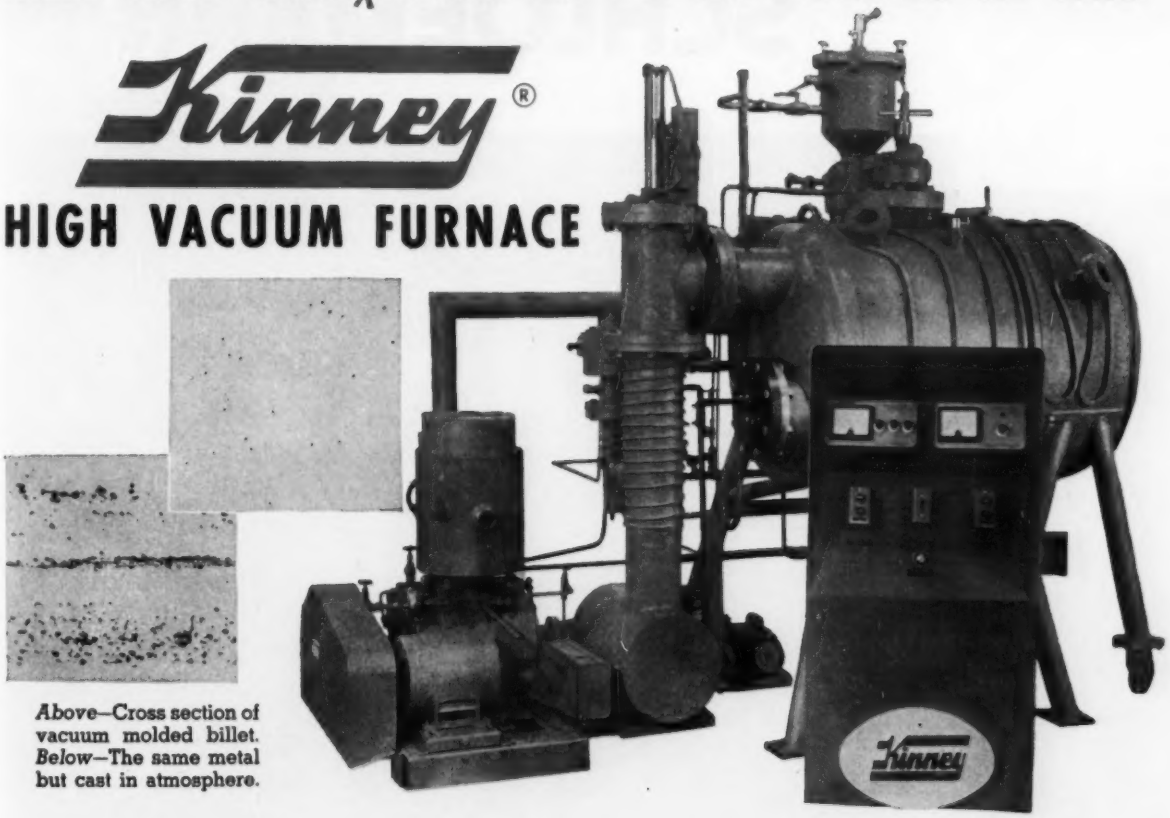
Head Office: Ohtemachi, Chiyoda-ku, Tokyo **Cables:** STEELTUBE TOKYO, KOKANSHIP TOKYO
New York Office: Room No. 1115, 39 Broadway, New York 6, N.Y., U.S.A.

perfect

MELT AND CAST PIECES UP TO 50 POUNDS IN THIS—

Kinney®

HIGH VACUUM FURNACE



Above—Cross section of vacuum molded billet. *Below*—The same metal but cast in atmosphere.

When you can't afford to let gases reduce the quality of your castings and run reject rates out of sight, the practical money-making aspects of KINNEY High Vacuum Furnaces assert themselves. The 50 pound model shown has found excellent application with high nickel steel, carbide tool steel, uranium and other metals. But, the value of this KINNEY Furnace is not confined to the more exotic metals . . . low alloy steels are dramatically improved by vacuum processing.

ADD TO MELT WITHOUT BREAKING VACUUM

You can introduce alloying material or add to the melt while maintaining a high vacuum in this versatile furnace. You can also operate the furnace using moderate positive pressure and an inert gas atmosphere.

ENGINEERED FOR PERFORMANCE

The furnace chamber features a full-opening hinged door or a rollaway type door with vertical or oblique split. Valving and special mechanisms for manual or automatic operation can be supplied and numerous accessories are available such as: various sizes of induction heating units, indexing of mold table, dip thermocouple and probe rod.

Complete your file of KINNEY High Vacuum equipment. Write for new Bulletins on Furnaces for Sintering, Annealing, Degassing, Brazing and Heat Treating.

AT THE METALS SHOW... VISIT THE KINNEY BOOTH... Get the facts on what's new in High Vacuum

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3634K WASHINGTON STREET • BOSTON 30 • MASS.

Please send us your latest literature on KINNEY High Vacuum Furnaces and KINNEY High Vacuum Pumps and Accessories.

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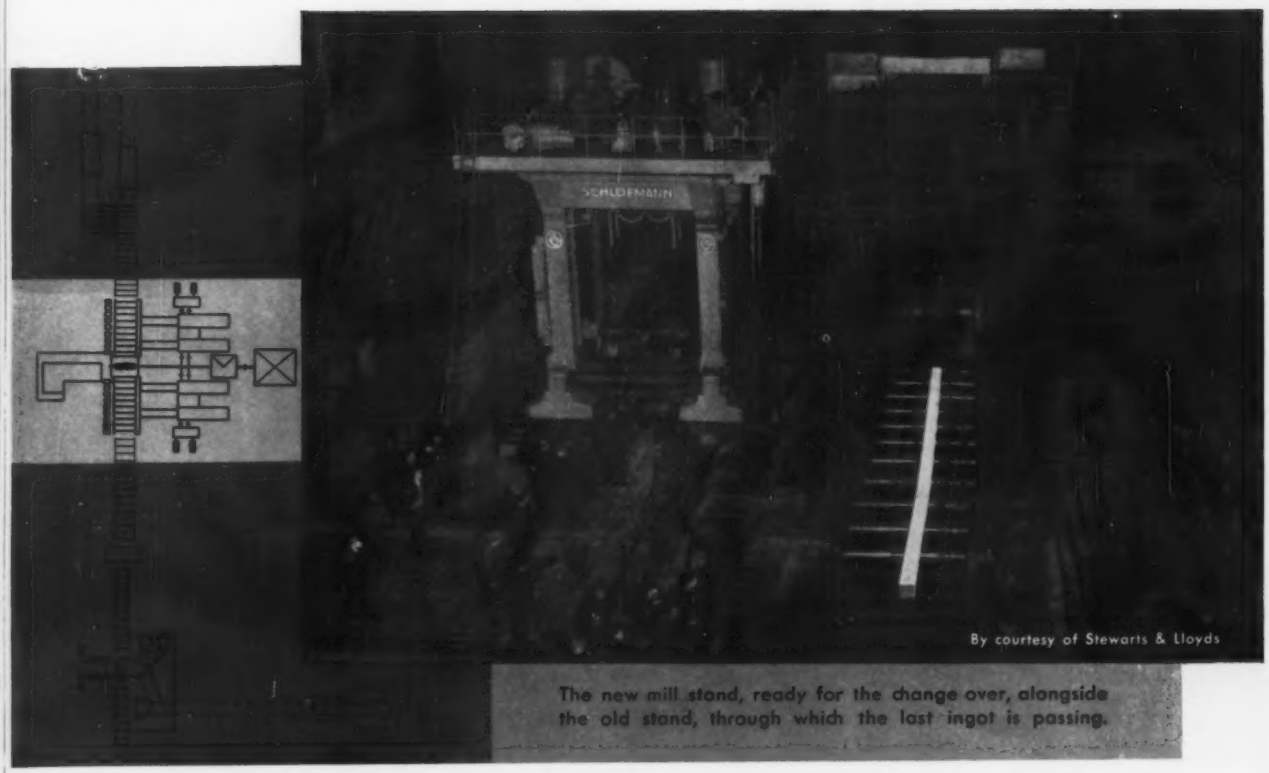
SCHLOEMANN



By courtesy of Stewarts & Lloyds

The new mill stand, ready for the change over, alongside the old stand, through which the last ingot is passing.

Installation of a Blooming and Slabbing Mill in Record Time

Losses are incurred every day a plant stands idle. Therefore, when a rolling mill is to be converted or expanded, rolling mill engineers aim at keeping idle time to a minimum. Experience enables installation work to proceed rapidly and smoothly.

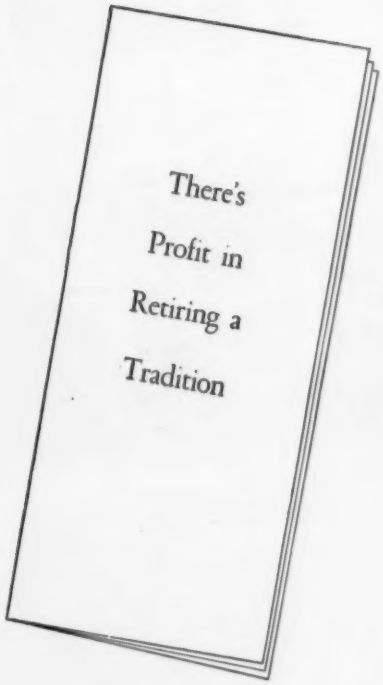
To quote the trade press, a "world record" was established for the speedy installation of a heavy rolling mill at the plant of Stewarts & Lloyds, Corby, England – through the excellent cooperation of all concerned. Due to the expansion of the mill schedule, the blooming mill supplied by SCHLOEMANN in 1937 had to be renovated. 30,000 cu.ft. of old foundations and 1,500 tons of machine components had to be removed; 50,000 cu.ft. of new foundations had to be laid, and sub-assemblies weighing 1,750 tons installed. The last bloom was rolled on the old mill on December 5th, 1958, and 10 days and 10 hours later, the new 48 in. rolling mill (1st stage) designed by SCHLOEMANN was put into operation without a trial run. After only eight days, weekly production was close to the 30,000 ton planned output.

The rolling mill is laid out to break down cast ingots and slab ingots weighing from 5 to 10 tons, at an annual production rate of 1½ million tons. Costs resulting from interrupted production were minimized, and the effort involved through the speedy conversion was more than justified.

FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

DON'T WASTE DOLLARS IN MACHINE OUTPUT

TO SAVE PENNIES IN TOOL LIFE



SEND FOR THIS BOOKLET TODAY!

With rising costs and increased competition from both foreign and domestic sources . . . you will find this a timely review of how some shops are reducing machining costs per piece by retiring certain outmoded ideas. As one plant owner did, perhaps you too will conclude . . . "A cutting edge on an indexable carbide insert that costs only a few cents is an extremely small price to pay for the efficient use of machines costing thousands of dollars."

Proof? Check actual on-the-job results shown in the table below

Get the complete story. Send for this booklet today and ask your Kennametal Representative for complete information on how Kendex* (patented) tooling is increasing productivity on many types of machining operations. Write KENNAMETAL INC., Dept. DP, Latrobe, Pa.

*Trademark

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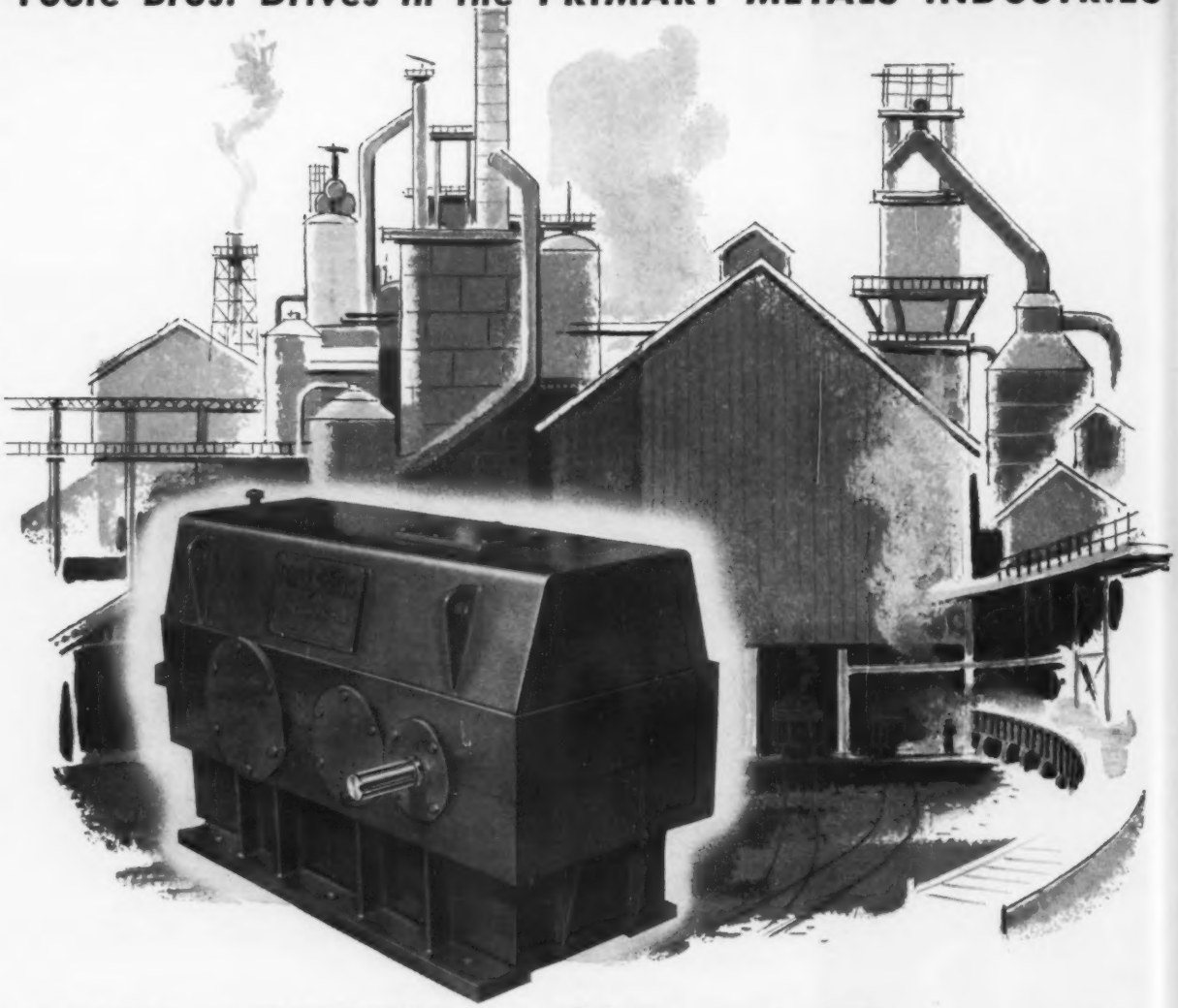
INDUSTRY AND
KENNAMETAL
...Partners in Progress

Typical Examples—Same Machines . . . Same Tools . . . Same Workpieces								
	Job No. 1		Job No. 2		Job No. 3		Job No. 4	
	240-Minute Tool Life Setup	25-Minute Tool Life Setup	75-Minute Tool Life Setup	25-Minute Tool Life Setup	120-Minute Tool Life Setup	80-Minute Tool Life Setup	120-Minute Tool Life Setup	22-Minute Tool Life Setup
Machine Cost per Hour	$ 8.00	$ 8.00	$10.00	$10.00	$ 9.00	$ 9.00	$ 9.00	$ 9.00
Tool Cost per Hour	$ .04	$ .40	$ .36	$ .76	$ .14	$ .215	$ .14	$ .77
Cost per 8-Hour Shift	$64.32	$67.20	$82.88	$86.08	$73.12	$73.72	$73.12	$78.16
Pieces per Shift	51	181	8	17	94 hrs./pc.	41 hrs./pc.	8	16
Cost per Piece	$ 1.26	$ .37	$10.36	$ 5.06	$859.16	$377.81	$ 9.14	$ 4.88
Cost Reduction	70%		51%		56%		47%	

Foote Bros. Drives in the PRIMARY METALS INDUSTRIES



ALL STEEL *Maxi-Power...*

maximum performance drive in a tough steel housing

Add a functionally designed and carefully engineered, high strength fabricated steel housing to the basic heavy duty Maxi-Power Parallel Shaft Helical Gear Drive components, and you get a unit that is capable of resisting severe external impact, in addition to delivering maximum performance.

Maxi-Power Drives are found in the Primary Metals Industries wherever power demands are heavy, and operating conditions require the ultimate in strength, stamina and efficiency.

The heavy, precision machined steel bed of these drives keeps broad faced helical gearing in precise alignment to provide a smooth, overlapping mesh with close backlash tolerances. Tooth deflection is uniform under the heaviest loads. Heavy duty anti-friction bearings are conservatively rated to handle severest shock loads.

Maxi-Power Drives are available in nine combinations of shaft assemblies to permit a variety of gear drive arrangements between the prime mover and driven equipment. Maxi-Power Drives are available in Single, Double, and Triple Reductions. Standard Ratios are from 2.08 to 1 and up to 360 to 1. Capacities to 1550 HP.

Why not get the complete story on Maxi-Power soon? Write for Engineering Manual MPB and full details on the All Steel Drive today.

100 YEARS SERVING INDUSTRY 1859-1959

FOOTE BROS.

Better Power Transmission Through Better Gears

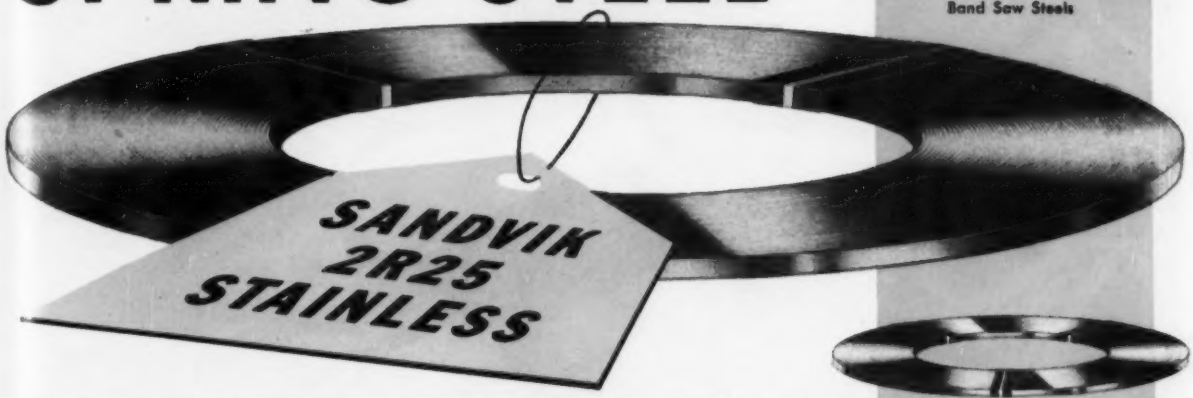
Find Your Nearest Distributor In The 'Yellow Pages'

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4565 S. WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

New Star Performer In The Sandvik Line

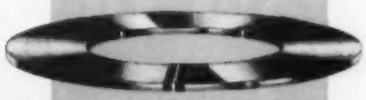
SANDVIK

Presents A SUPER SPRING STEEL



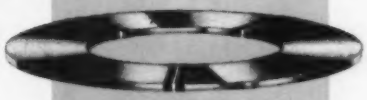
Hardened & Tempered Spring Steel

Annealed Spring Steel



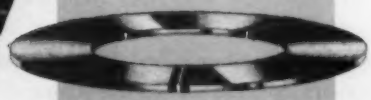
Band Saw Steels

Flapper Valve Steel



Piston Ring Steels

Razor Blade Steel



Shock Absorber Steel

Sandvik's new 2R25 is a superior grade of stainless spring steel which goes far beyond the capabilities of ordinary spring steels. It was developed for applications where performance outranks cost.

This new steel is a prime example of Sandvik's ability to combine several advantageous properties in one metal.

Sandvik 2R25 is exceptionally tough and resilient, much more formable than hardened and tempered steel, has up to 10 times the fatigue life of ordinary carbon spring steel and has excellent corrosion resistance under varying atmospheric conditions.

Mechanical Data on 2R25 —

TENSILE STRENGTH RANGE — Hard Rolled 242,000 • 270,000 or 299,000 PSI Heat Treated 270,000 • 299,000 or 327,000 PSI

ELASTIC LIMIT (.01% Proof Stress) — From 156,000 to 192,000 PSI according to size and finish

MODULUS OF ELASTICITY — 27.7 to 35.6 x 10^6 PSI according to size and finish

SIZES (with extremely close tolerances)
Thickness — .0016" to .035"
Width — .039" to 3.94"

For further information on Sandvik 2R25, contact your nearest Sandvik office

Sandvik stocks a wide variety of qualities and sizes of cold rolled specialty strip steels. In addition Sandvik has rolling, slitting, edge-filing and hardening and tempering facilities. *Send for your copy of this free brochure* which gives specific data on the leading types of Sandvik steels.

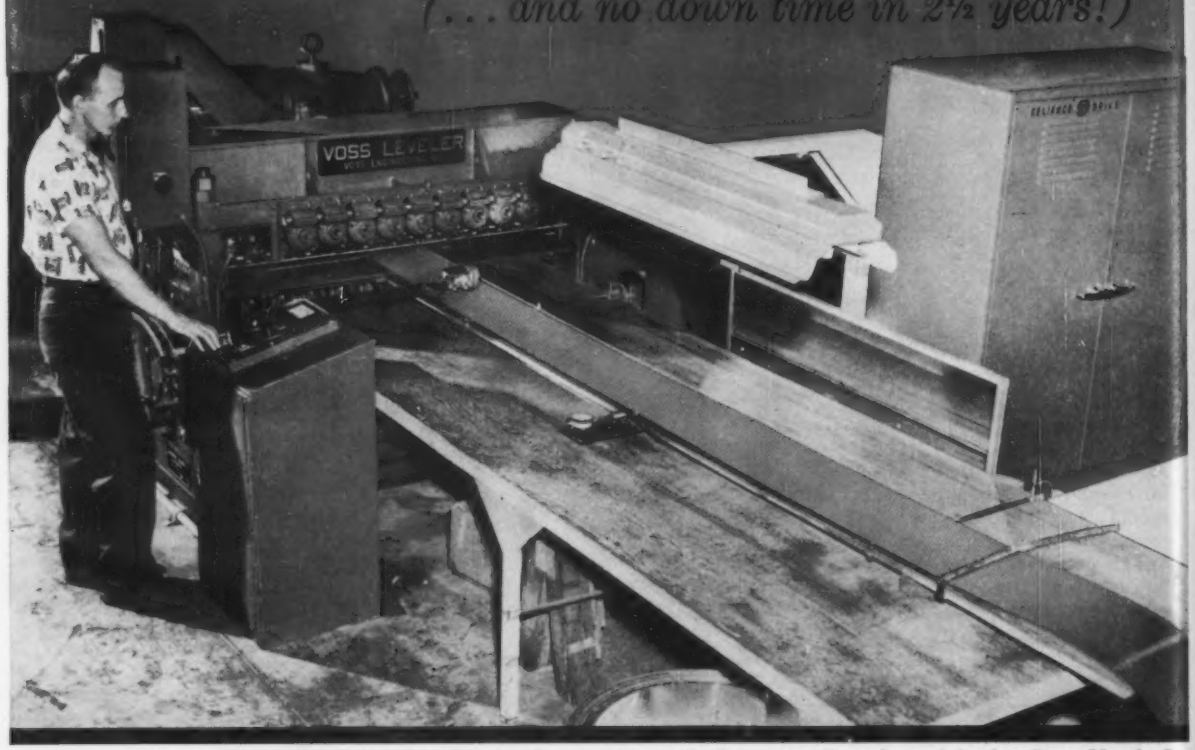
SANDVIK STEEL, INC.

1702 Nevins Road, Fair Lawn, N. J.
Tel. SWarthmore 7-6200 • In N. Y. C. ALgonquin 5-2200
***Branch Offices:* Cleveland • Detroit • Chicago • Los Angeles**
SANDVIK CANADIAN LTD. P.O. Drawer 1335, Sta. O. Montreal 9, P. Q.
***Works:* Sandviken, Sweden**

88-178

DEAD FLAT ALUMINUM STRIP... UP TO 150,000 POUNDS DAILY— ON VOSS ROLLER LEVELERS

(... and no down time in 2½ years!)



One of two Voss Levelers in operation at the Lancaster, Pa., plant of Quaker State Metals Co.

Ask Quaker State Metals Company, a leading supplier of aluminum to siding manufacturers. Quaker State puts *all* their aluminum siding stock through Voss Levelers, because *only Voss gives them the absolute flatness their customers demand.*

Quaker State's first Voss Leveler was installed 2½ years ago, the second one a year later. Both have withstood long periods of 24-hour operation, leveling up to 75,000 lbs. per machine daily . . . with no downtime since installation!

Voss Levelers will solve almost any leveling problem . . . *at high production speeds.* Patented features make possible accuracy and flatness unheard of with any other leveler, *equalling or exceeding stretcher-level flatness in* many cases. Voss Levelers are now in use in steel, aluminum and other non-ferrous plants, in applications ranging from heavy plate to cold-rolled strip, galvanizing lines, aluminum sheets and many others. Let Voss put its years of experience to work for you. Call or Write today.

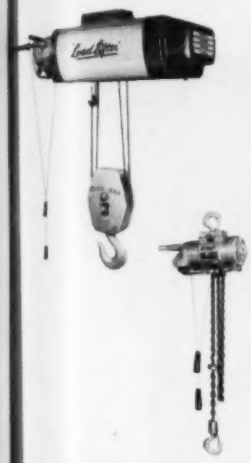
Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

MODERNIZE CHOOSE HOISTS THAT SAVE THE MOST

You name the hoisting problem. Whatever the requirements, there's an MMM hoist to handle your lifting with money-saving efficiency. Call your nearby Shaw-Box Distributor for practical help in selecting the best type of hoisting equipment for each load handling task. Or, write us for literature.

AIR HOISTS



Load Lifter Air Hoists with wire rope load line. 1 to 15 tons. The 5-cylinder radial motor has a high starting torque; provides smooth operation at all lifting speeds. Speeds infinitely variable to 37 FPM, depending upon capacity. Pendant cord control standard; throttle control available. Mechanical load brake never needs adjustment. Compact design results in low headroom advantages. Lug, push trolley and hand-geared trolley suspension.

Budgit Air Hoists. ¼, ½ and 1 ton. Compact and light in weight. Link and roller chain types. Explosion proof motor cannot burn out. Spark and corrosion resistant link chain type models. Speeds infinitely variable to 75 FPM, depending upon capacity. Pendant cord control. Safety hooks standard. Rigid mount type and push trolley available.

ELECTRIC HOISTS

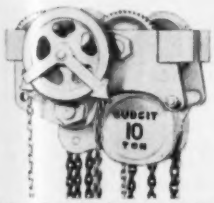
Load Lifter Series "700" Wire Rope Electric Hoists. ½ to 15 tons. Fast, heavy-duty hoists with two automatic brakes and safe 24-volts at the push-button control. Two-speed models for spotting fragile loads safely. Lug suspension and push, hand-geared and motor-driven trolleys available. Hi-hook model increases length of lift.

Load Lifter Series "600" Wire Rope Electric Hoists. ½ and 1 ton. Low headroom construction. Tough, light-weight hoists that speed production processes. Separate load and motor brakes act simultaneously. Single and two-speed models with 24-volt push-button stations. Lug or hook suspension; push and motor-driven trolleys available.

NEW!

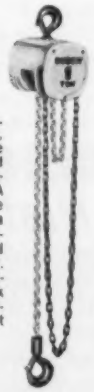
P:B Budgit Electric Hoists. ⅛ to 2 tons. Modern safety-first hoists for money-saving load handling. Push-button control — plus separate motor and load brakes that operate simultaneously — provide fast, accurate "spotting" action. All capacities delivered ready to hang up, plug in and use. AC and DC types. Hook suspension. Trolleys available. Standard models have pull cord control.

HAND HOISTS



Budgit Army Type Hoists. ¼ to 10 tons. Integral push, hand-geared trolleys are adjustable to fit I-beams in a number of sizes. Low headroom design permits high hook lift. Efficient spur gearing and load brake speed hoisting action. Extensive use of strong aluminum alloys saves weight and reduces effort needed to travel the hoist. Spark and corrosion resistant models available.

Budgit Chain Blocks. ¼ to 10 tons. Light, tough aluminum frame seals in spur-geared mechanism and automatic load brake. A 25-lb. pull on the hand chain lifts a 500-lb. load. Fast acting brake speeds and simplifies lowering. Hook suspension. Trolleys available. Ask about spark and corrosion resistant models.



Tugit — the Lever-Operated Hoist. ¾ to 3 tons. A spur-geared, light-weight lifting and pulling tool you can carry around. Has a thousand and one uses. Operates easily at any angle, even in close quarters. A 42-lb. pull on the handle lifts 2 tons. Spark and corrosion resistant models.

Budgit Differential Hoists. ¼, ½ and 1 ton. A durable, low-priced lifting tool for occasional use where high efficiency is not required. The aluminum alloy yokes assure both lightness and strength. Precision machining makes operation easy and compactness saves headroom.

Budgit Roller Chain Block. ¼ to 2 tons. Spur-geared for highest efficiency. A pull of 45 lbs. on the hand chain lifts ½ ton. Light and strong. Mechanism enclosed in sealed housing — operates in grease. Automatic brake holds load safely at any desired point.

ACCESSORIES

Budgit Trolleys. ¼ to 2 tons. Travel the hoist smoothly on ball bearings. Adjustable to fit I-beams of several sizes. Spark and corrosion resistant models.

Budgit Hi-Cap Trolleys. 3 to 20 tons. Adjustable push type. Wheels have crowned treads for easier movement, longer wear. Bumpers protect wheels. No lubrication required. Spark and corrosion resistant models.

Budgit Geared-Type Trolleys. 3 to 20 tons. Adjustable to fit 8" to 24" I-beams. Easy action geared drive wheel and guide are weatherproof aluminum alloy. Hand chain is cadmium plated. Spark and corrosion resistant models.

Budgit Cord Reel. Keeps hoist conductor cord out of the way. Reels off in any direction. Also useful for portable tools with polyphase motors to 7½ hp.; single phase to ½ hp.

Budgit Conducter Cord Trolley. Used in any number to hold hoist or other conductor cord aloft on monorail systems and crane I-beams.

Lead Scale. 250 to 5,000 lbs. Permits weighing loads while in suspension. Saves handling time, cuts costs. Also serves to guard against overloading lifting equipment.

Budgit Gantry "A" Frames. 1 and 2 tons. For low-cost mobile lifting service. Caster equipped. Shipped knocked down. Easy to assemble with I-beam purchased locally.

59L-4R

MAXWELL MANNING & MOORE INC. MM&M TRADE MARK

OVERHEAD LOAD HANDLING EQUIPMENT

Products of

MANNING, MAXWELL & MOORE, INC.

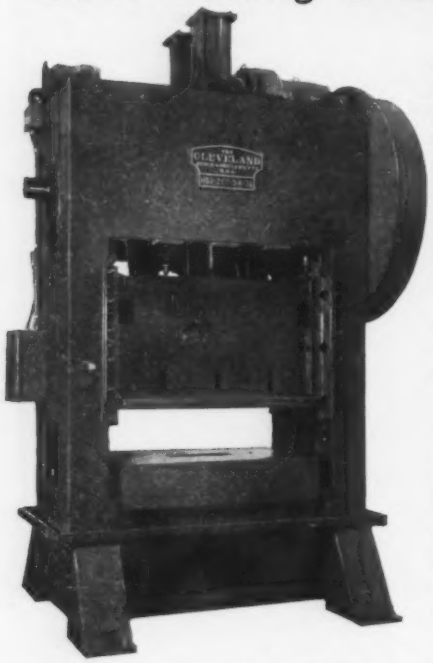
Shaw-Box Crane & Hoist Division • Muskegon, Michigan

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

For Greater Economy In Metalworking

CLEVELAND

Cost-Cutting PRESSES

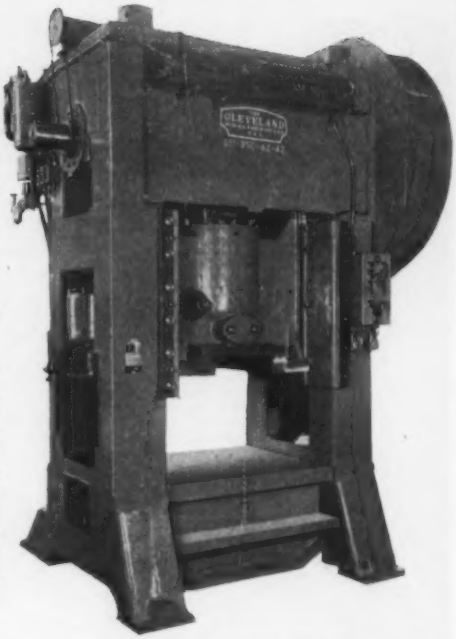


Cleveland high-speed Double Eccentric Press, 200-ton capacity, operates at 50 to 150 strokes per minute for high-speed punching, shearing, perforating, bending and forming.

Are production breakdowns, slow outmoded presses and mounting maintenance costs destroying your profits? A check of your press performance records may show you're already paying for new presses . . . *without their benefits.*

For lower operating costs, quicker starting, increased production, investigate the new minimum-maintenance Cleveland Presses. Our engineers are ready to help you plan a program of replacing old inefficient presses with modern cost-cutting Cleveland Presses of the exact type, size and capacity to meet your need.

You get better stampings for less with a Cleveland Press.



Cleveland's cost-cutting Single Eccentric Press, 350-ton capacity, operates at 60 strokes per minute, has air-counterbalanced slide and auxiliary air brake on flywheel.

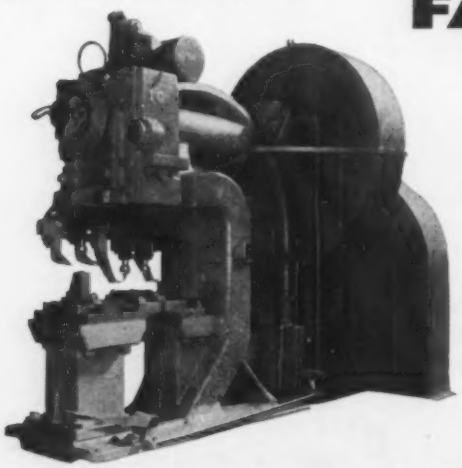
FABRICATING TOOLS

For Plate and Structural Steel

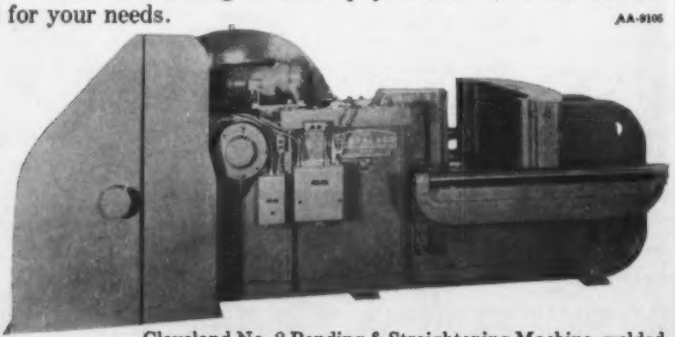
Ruggedly built for profitable production and simplicity of operation, Cleveland Fabricating Tools are designed for trouble-free operation and years of service—a fact proven by leading shipyards, bridge builders, railroads, structural shops and boiler makers since 1880.

For punching, coping, notching, shearing, bending and planing I-beams, steel plate, bars, angles and other structural shapes, you can do it better, more economically with Cleveland Fabricating Tools. Write for Catalog #9 to help you determine the correct tool for your needs.

AA-9106



Cleveland I G Beam Punching Machine equipped with 3 gaged punching attachments, one high and two low die holders, 24″ throat, completely enclosed gears and flywheel, punching capacity: standard 6″ to 24″ I-beams in flange and web. Other capacities and sizes available.



Cleveland No. 2 Bending & Straightening Machine, welded steel frame, completely enclosed gears and flywheel, arranged for direct-drive motor and equipped with power adjustment to plunger through separate motor. Capacity: bend or straighten 24″ I-beams vertically or horizontally.

THE CLEVELAND PUNCH & SHEAR WORKS CO
Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

Salt River Valley Water Users Association,
Phoenix, Arizona

Saves $699.00 per pump...

by using ground and polished

fatigue-proof STEEL BARS **e.t.d.**

made by elevated temperature drawing process

The men who operate the "Salt River" project have the job of supplying water to 240,000 acres of land in Arizona, where the Gila River joins the Salt River. The Association maintains some 250 deep well pumps to help supply the required water.

Richard Juetten, Supervisor of Salt River's Pump Division, reports that the use of La Salle FATIGUE-PROOF steel bars has permitted a saving of $699.00 per pump . . . a potential saving of $174,750 when applied to the 250 pumps now in operation.

Mr. Juetten's report follows:

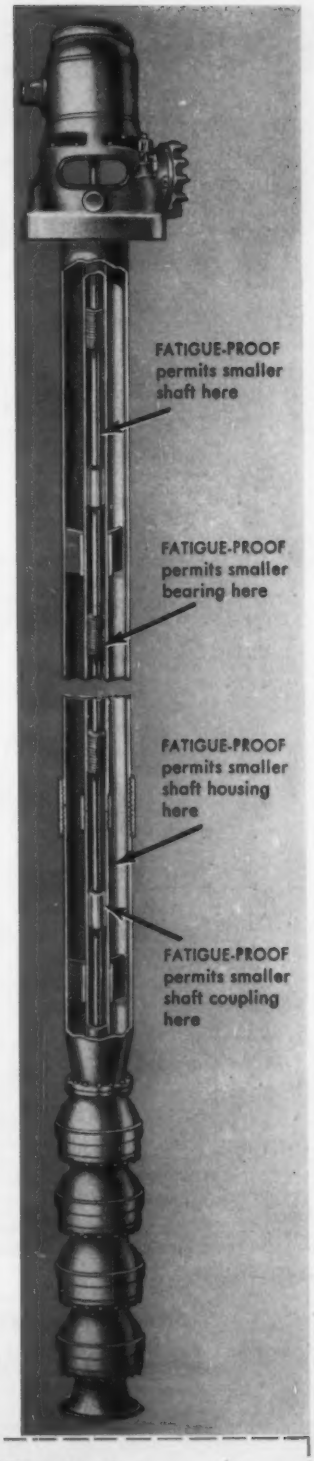
"I have figured our direct saving realized by using La Salle FATIGUE-PROOF steel bars in place of standard C-1045 steel shaft in our deep well turbine pumps.

"FATIGUE-PROOF enables us to use bars only $1\frac{11}{16}$" in diameter . . . instead of $2\frac{3}{16}$" diameter shafts which were necessary when we used C-1045 . . . and this despite higher horsepower, more weight, and additional pump bowl assemblies.

"Here are comparative costs per 10-foot section (of a 300-foot pump shaft):"

using C-1045		using FATIGUE-PROOF	
10' x 2-3/16" dia. shaft	$28.30	10' x 1-11/16" dia. FATIGUE-PROOF	$22.59
3½" shaft housing	26.30	3" shaft housing	19.80
2 bearings, 3½" x 2-3/16"	21.72	2 bearings, 3" x 1-11/16"	13.46
Shaft coupling	5.16	Shaft coupling	2.34
TOTAL cost	$81.48	TOTAL cost	$58.19
Cost per foot	$ 8.15	Cost per foot reduced to	$ 5.82

RESULT: A saving of $2.33 per foot . . . or $699.00 when applied to a 300-foot pump setting. And this doesn't take into consideration reduced power consumption.


FATIGUE-PROOF permits smaller shaft here
FATIGUE-PROOF permits smaller bearing here
FATIGUE-PROOF permits smaller shaft housing here
FATIGUE-PROOF permits smaller shaft coupling here

La Salle STEEL CO.

1436 150th Street
Hammond, Indiana

ASK FOR 24-PAGE BOOKLET—It tells the complete story of FATIGUE-PROOF®

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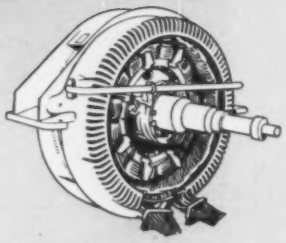
address_____

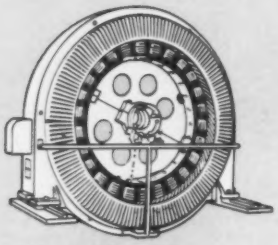
city and zone_____ state_____

Mail to La Salle Steel Company, 1436 150th Street, Hammond, Indiana

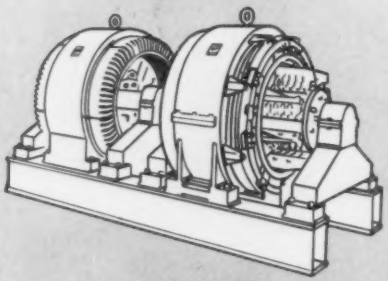
MATCHED-TO-THE-JOB PERFORMANCE
assured by
EP SPECIALIZATION



SYNCHRONOUS GENERATORS
125-5000 KVA
ASK FOR BULLETIN 43-205



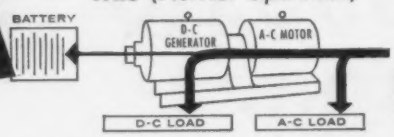
SYNCHRONOUS MOTORS
20-5000 HP
ASK FOR BULLETIN 43-205



MOTOR-GENERATORS
¾-1500 KW
ASK FOR BULLETIN 30-200

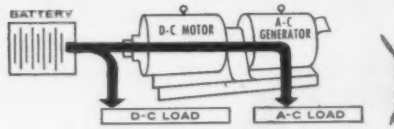
also
ELECTROLYTIC POWER SUPPLIES
FREQUENCY CHANGERS
INDUCTION MOTORS
D-C MOTORS & GENERATORS
ADJUSTABLE-SPEED DRIVES

THIS (Normal Operation)

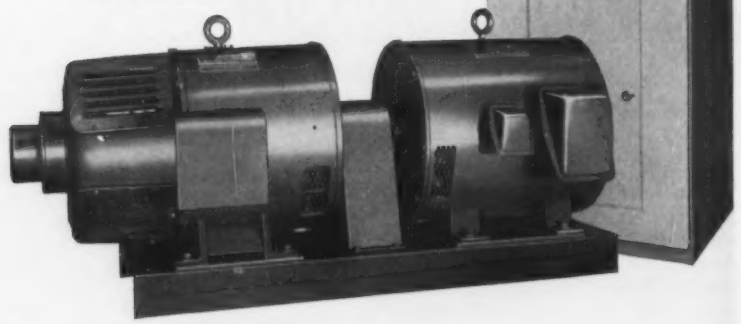


A-C POWER SUPPLY

BECOMES THIS (Emergency Operation)



~~A-C POWER SUPPLY~~



Inverter-Diverter

THE ONLY CONTINUOUS A-C and D-C POWER SYSTEM

This standby Power System changes from normal operation to emergency operation (when the normal a-c power supply is interrupted for any reason) without any appreciable change of voltage or frequency of the load current. The changeover is instantaneous. It is ideally suited for any application where *UNINTERRUPTED* electrical service for either or both a-c and d-c loads is required.

Only *one* motor-generator set is used as a combined battery charger, d-c power supply and a-c standby power. Note, from the diagrams above, how the D-C Generator and A-C Motor "invert" for emergency operation. And the D-C Generator is the well-known Electric Products DIVERTER-POLE with its unequalled battery-charging characteristics.

The Inverter-Diverter requires less space, reduces installation time and expense, cuts maintenance costs and provides absolute dependability. For complete details:

ASK FOR BULLETIN 21-200

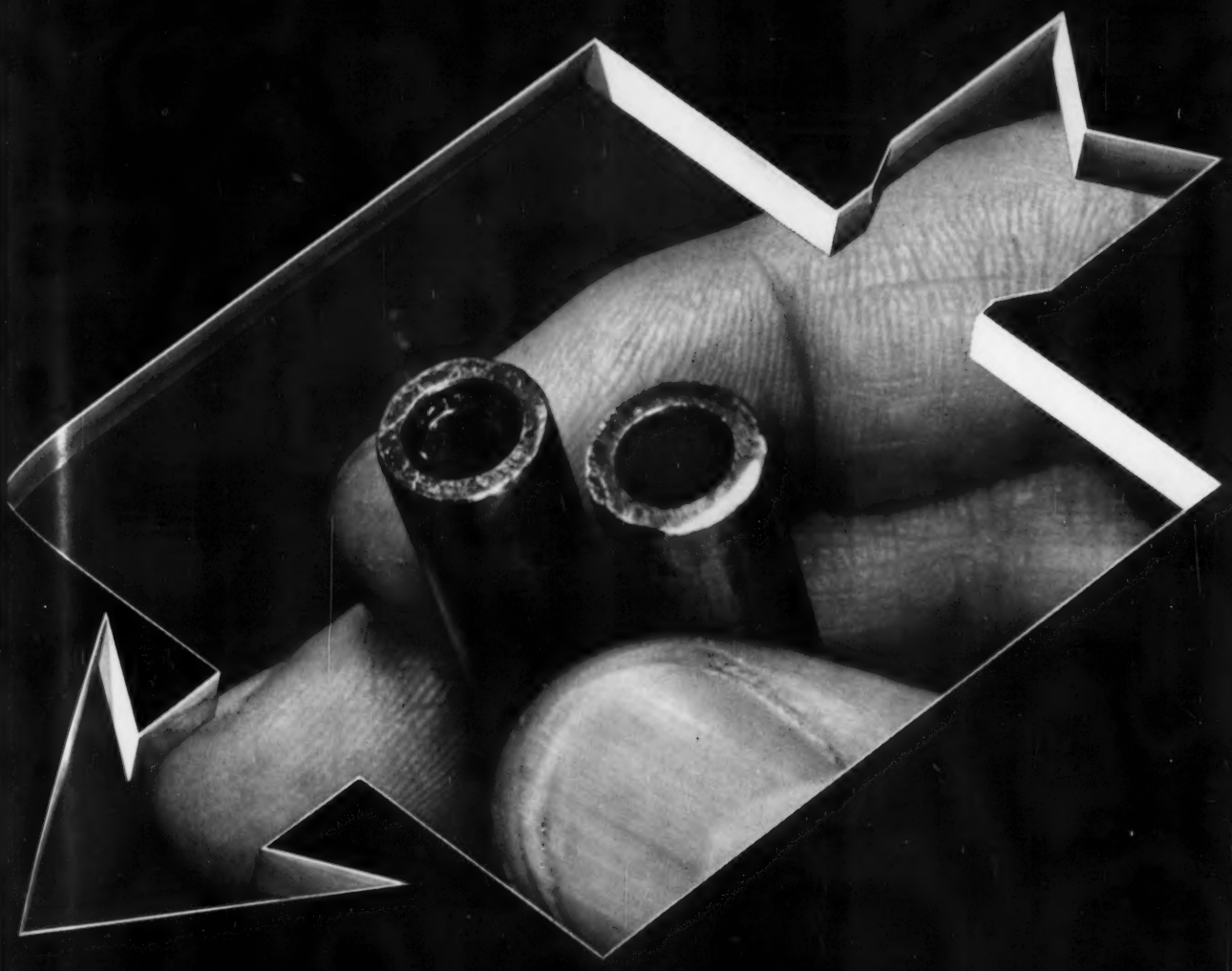
EP ENGINEERS A TYPE OF CONTINUOUS A-C AND D-C POWER SYSTEM TO MEET THE SPECIFIC APPLICATION REQUIREMENTS

ELECTRIC PRODUCTS COMPANY

1725 CLARKSTONE ROAD CLEVELAND 12, OHIO

EP

Quality–the best economy of all



Two oils...two lines...one clogged...one cleaned

A Sunvis 700 oil and a regular oil were run through two equally clogged hydraulic lines. The regular oil couldn't remove the sludge. The Sunvis 700 oil cleaned its line thoroughly. That's one job it's made for... to clean out sludge deposits in hydraulic lines while it transmits power.

With a Sunvis 700 oil—like every Sunoco oil—you enjoy the best economy of all: the economy of quality. A Sunvis 700 oil lasts longer. The machinery it protects lasts longer. It prevents rust... ups output by reducing downtime.

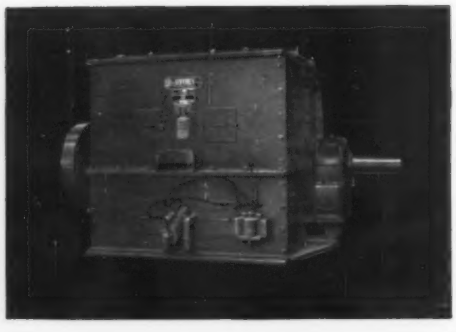
FREE Trouble-Shooting Chart will help you spot and cure common hydraulic system troubles. For your copy, write to:

Sun Oil Company, Philadelphia 3, Pa., Department I-12.

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

SUNOCO

Jeffrey Pulverizer crushes fluxstone fine for efficient sintering



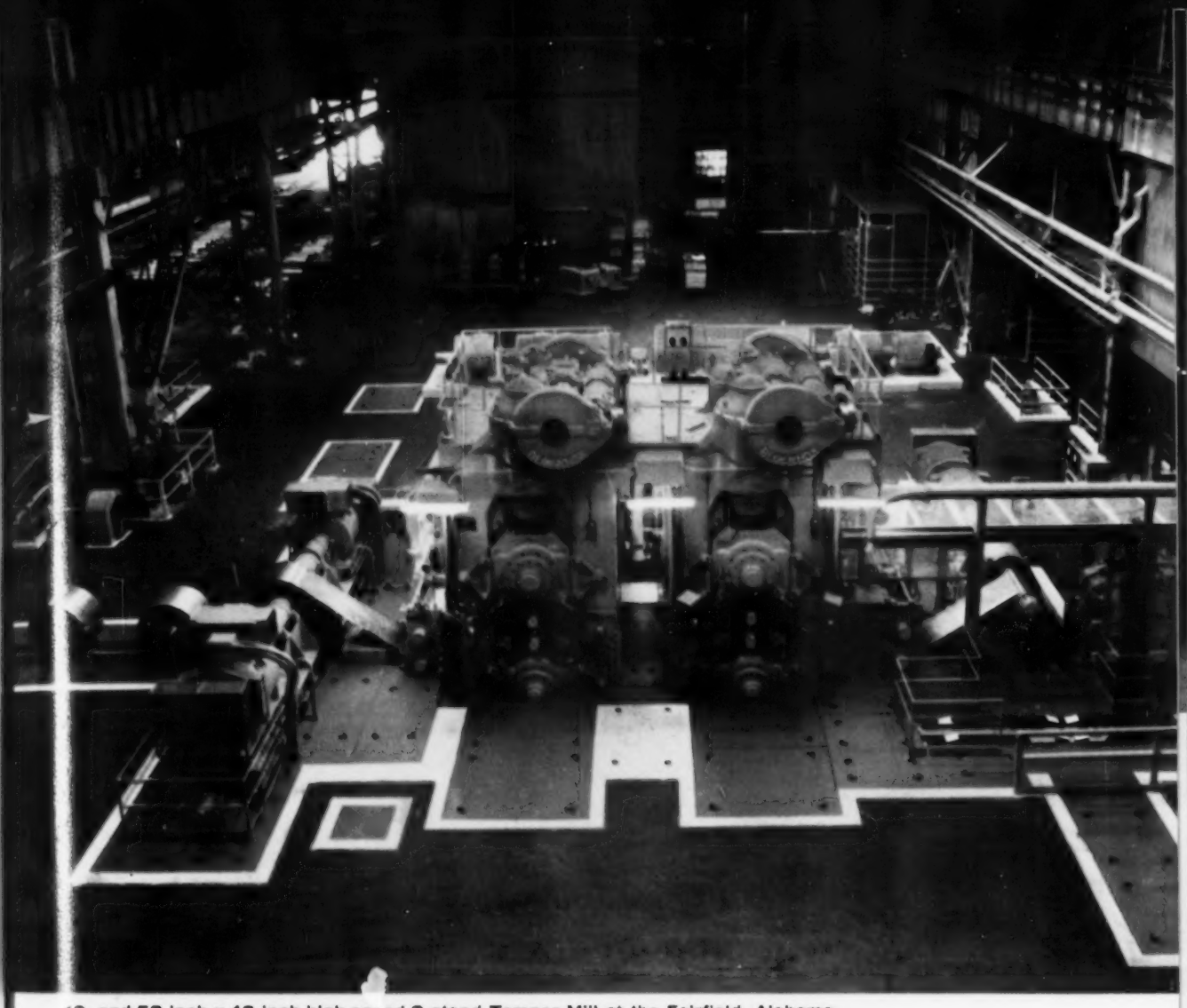
The Jeffrey Type B Pulverizer has many advantages in crushing fluxstone for sintering operations. It crushes *fine* – standard 3/8", or 1/8", when required. This is possible since the material goes through several changes in direction and several hammer contacts before it reaches the screen bars.

This unit is reversible, designed for heavy duty work, is dust-tight, and has hydraulic adjustments. Power requirements are less than with other units, since most of the work on the material is done before the material reaches the screen bars.

Fluxstone is but one of hundreds of materials which can be efficiently reduced with Jeffrey Crushers... from alum and asbestos to rock and slag. For complete information check your nearest Jeffrey sales engineer. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING



19- and 53-inch x 48-inch high speed 2-stand Temper Mill at the Fairfield, Alabama, works of the Tennessee Coal and Iron Division of the United States Steel Corporation.

BLAW-KNOX TEMPER MILLS

Blaw-Knox designs and builds a full range of two high and four high Temper Mills for integration into sheet, strip, and tin plate processing operations. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
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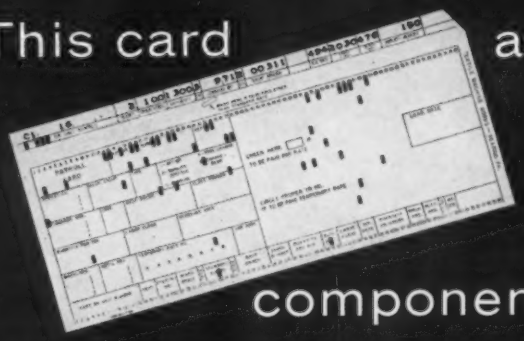
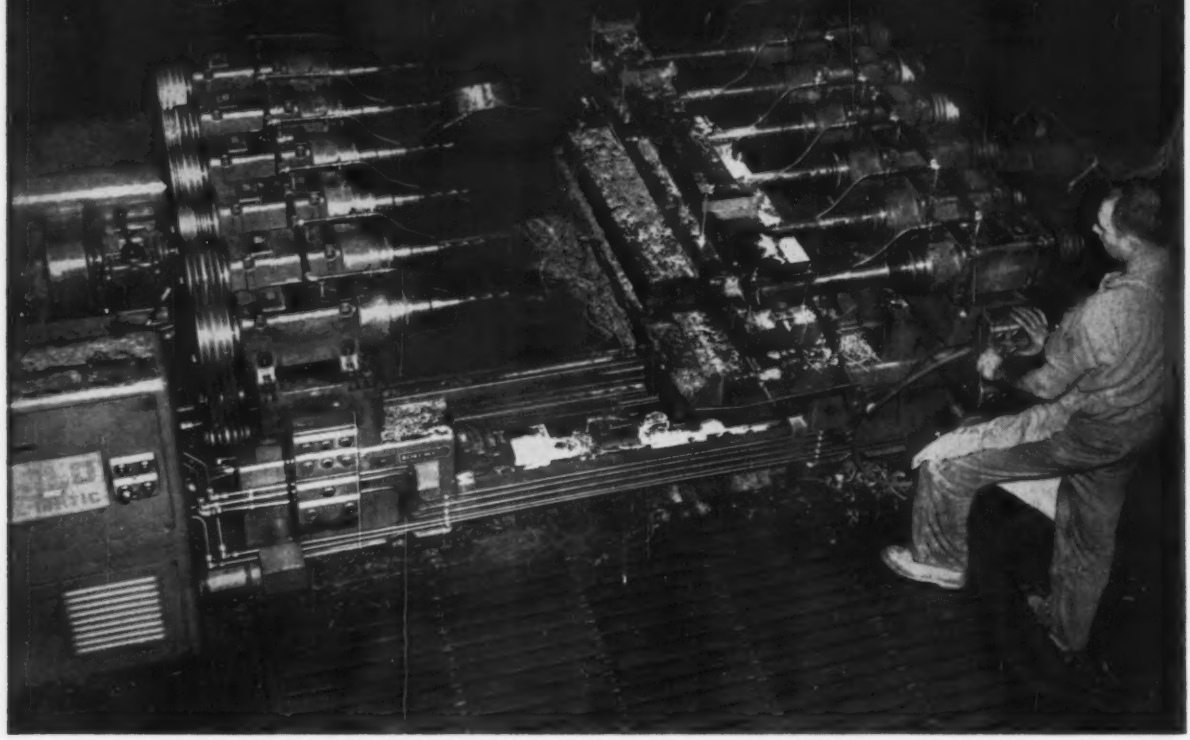
This card assures you *on-time delivery* of sub-contract components and assemblies





It's a small but important part of TMW's electronic punched card scheduling and control system. And it's your assurance that sub-contract jobs, regardless of size or quantity, are delivered *on time*.

You get this when you work with one of the world's largest, most modern and completely integrated manufacturers, whose 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now* on either a short or long term basis.

Textile Machine facilities include 1200 modern machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, plus a corps of the industry's top designers and engineers.

Combine these facilities with modern electronic production scheduling controls and quality control techniques . . . and you've got the perfect answer to all your sub-contract problems.

Write today for more detailed information, or for a copy of our latest Facilities File Folder.

TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania

BORG-WARNER SALUTES ITS **Ingersoll** DIVISIONS

The first Ingersoll plant, at Sandoval, Illinois
as it appeared in 1899

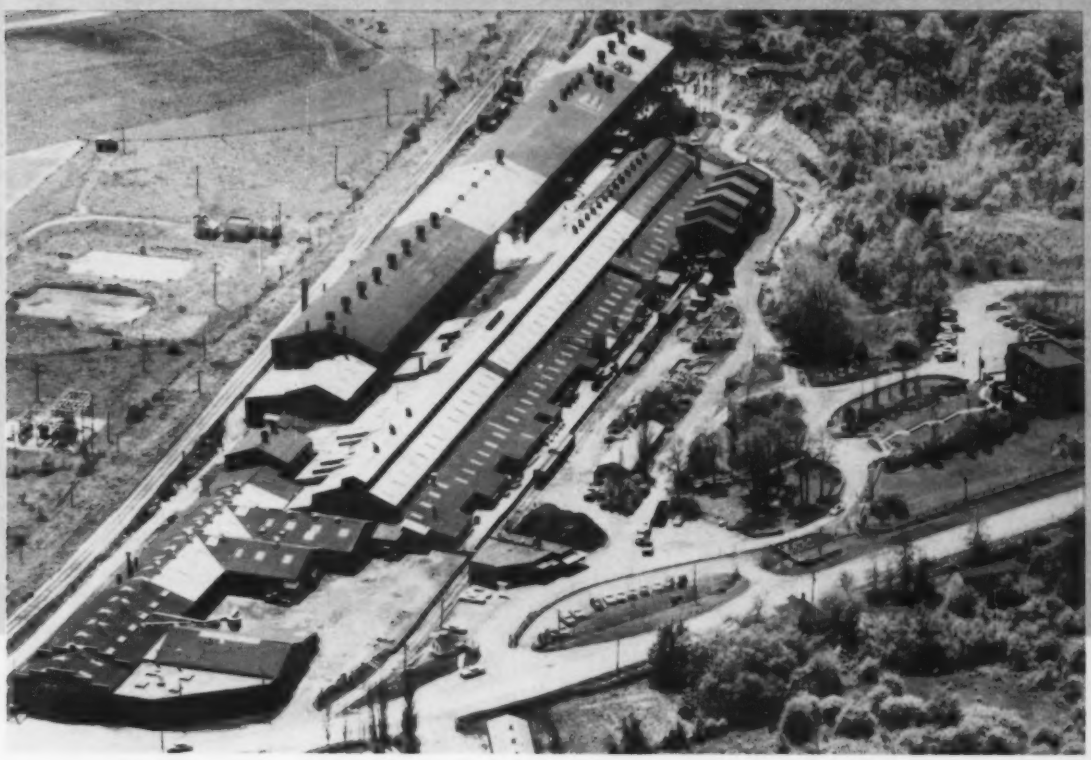
1884 *1959*

On Their 75th Anniversary

BORG-WARNER ENGINEERING B-W PRODUCTION **CORPORATION**

Ingersoll *Steel Division*

1884 — 75 — 1959
YEARS



Special Purpose Steels for Industry

In 1884, with a handful of employees and a small factory, Stephen A. Ingersoll founded the company that today includes four separate Borg-Warner Divisions, and the management and operation of a B-W subsidiary.

During these 75 years the Ingersoll employee force has grown to several thousand; manufacturing facilities have expanded to seven modern plants with approximately 2,000,000 square feet of space; and extensive product diversification now serves many industries.

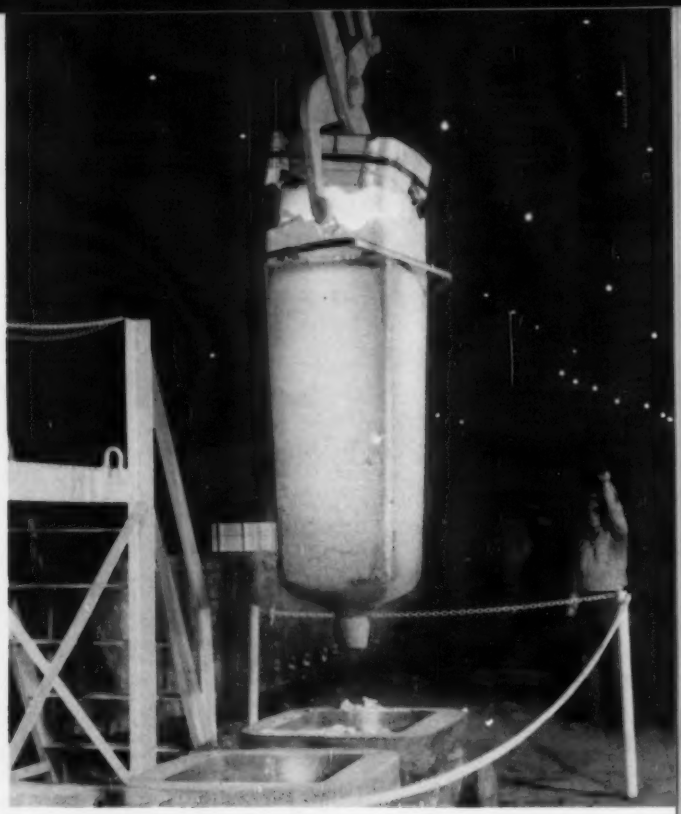
The New Castle, Indiana plant of INGERSOLL STEEL DIVISION was acquired in 1917 to supply the original company's expanding steel needs. Today INGERSOLL STEEL produces a wide variety of special purpose steels for industry. These include stainless and stainless-clad steels, heat resisting steels, high carbon and alloy steels, forging quality electric furnace alloy steel ingots, automotive clutch plate steels, cross-rolled tillage steel, soft center plow steels, knife and saw steels, high speed hack saw steels, and other special analysis steels.

In addition, INGERSOLL STEEL fabricates flat and formed agricultural discs, automotive and tractor clutch discs, steel hand shovels, spades and scoops, lightweight aluminum alloy scoops, and stainless steel scoops.

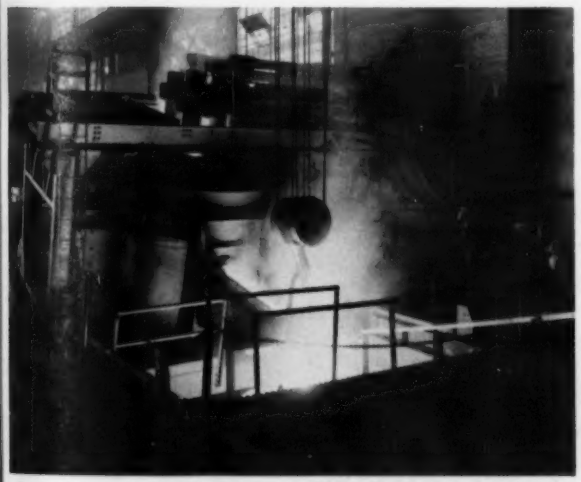
Back of all these products is the continuing Borg-Warner aim: "Design it better—make it better"—a tradition that benefits almost every American every day.

DESIGN IT BETTER INGERSOLL STEEL B-W BORG-WARNER® *MAKE IT BETTER*

Ingersoll Soft-Center steel is widely used by the farm implement industry in plow shares, moldboards, landsides, jointer blades and cultivator shovels.

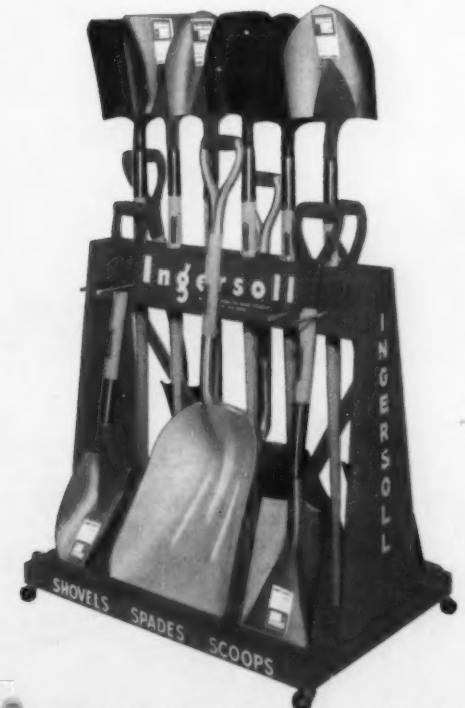


Ingersoll Steel produces forging quality electric furnace alloy steel ingots up to 23,000 pounds in size.



One of four electric furnaces for the melting of many kinds of special purpose steels.

To provide fast service on hurry-up orders, Ingersoll Steel maintains substantial stocks of stainless, high speed and alloy sheets, plates and ingots.

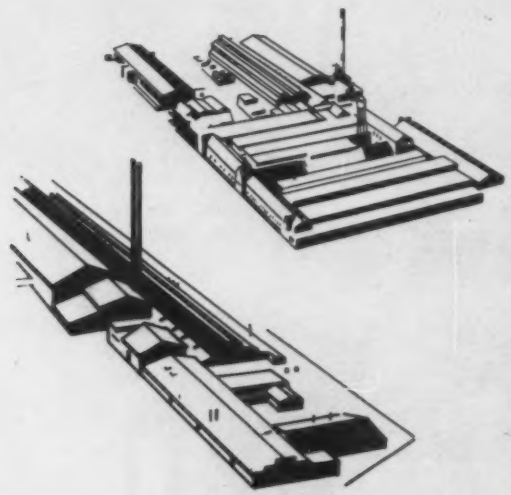


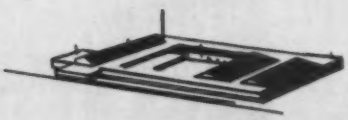
In the production of shovels, spades and scoops, Ingersoll Steel is the only manufacturer that melts, rolls and completely fabricates its own shovel steel. Ingersoll also produces lightweight aluminum alloy shovels and scoops.

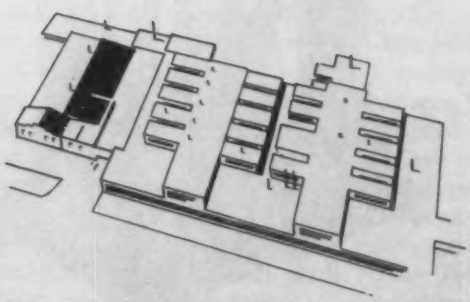
The Challenge . . . *and the Promise*

Recognizing that the achievements of the past are but a guide to the future, the Ingersoll Divisions of Borg-Warner reaffirm their continued adherence to the principles established by their founder—integrity of purpose, quality of product, and dedicated service. This is the Ingersoll challenge . . . and the Ingersoll promise.

THESE ARE THE INGERSOLL DIVISIONS OF BORG-WARNER







INGERSOLL PRODUCTS, Chicago, Illinois. Plow and harrow discs and coulter blades, pressed steel implement wheels, tractor seats and instrument panels, and other farm implement parts; tapered discs for truck wheels; formed and deep drawn steel stampings; raw and porcelain enameled washing machine tubs and components; porcelain enameled steel sinks and bathtubs; solid fuel furnaces; industrial cranes and hoists.

INGERSOLL STEEL, New Castle, Indiana. Open hearth and electric furnace high carbon and alloy steels; soft center plow steels; stainless and heat-resisting steels; stainless-clad steel sheets; forging quality electric furnace alloy steel ingots; high speed hack saw steels; agricultural flat and formed discs; automotive and tractor clutch discs; hand shovels, spades and scoops; lightweight aluminum scoops; stainless steel shovels and scoops.

INGERSOLL KALAMAZOO, Kalamazoo, Michigan. Materials handling equipment (Load Lugger System); special vehicles for the military; rocket motor cases and guided missile boosters; design agents for LVT amphibian landing vehicles.

REFLECTAL CORPORATION, Chicago, Illinois. (Ingersoll managed). Alfol aluminum foil reflective insulation for buildings; asbestos insulation; jacketing; KoolShade sun screen; Betocel cellular insulating concrete.

INGERSOLL-HUMPHRYES, Mansfield, Ohio. Enameled cast iron and steel bathtubs, sinks and lavatories; vitreous china water closets and lavatories; plumbing fixture fittings.

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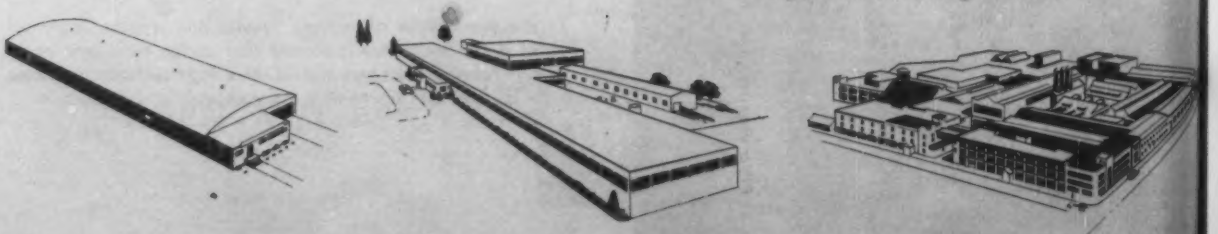

NOW! FABRICATE COMPLEX CASTINGS WITH 3M ADHESIVES!

Here's a new, virtually fool-proof way to fabricate complicated hollow castings. Simply bond and unitize individual *die*-cast *sections* with high-strength 3M structural adhesives, such as EC-1386. You'll cut rejects and costs, boost production, too.

Die-casting of sections eliminates rejections due to blow holes in sand core castings . . . means smoother, more detailed parts because of the machined surface of the metal die. And by bonding with 3M Adhesives rather than mechanically fastening sections, there's no need for costly machining and equipment, no wasteful bosses or flanges to eat up space. Easily applied with a flow gun, EC-1386 is 100% nonvolatile, and requires no pre-drying before joining sections.

With EC-1386, indexing or pressure jigs are not needed. The adhesive cures to high ultimate strength quickly in an air-circulating oven. (At 500°F, curing time is only one to two minutes.) And the cured bond can be machined for final touch-up operations.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

3M structural adhesives are doing many things in many fields. For more information and literature on the complete line, contact your 3M Field Engineer or write direct: A. C. & S. Division, 3M, Dept. SAQ-109, St. Paul 6, Minnesota.

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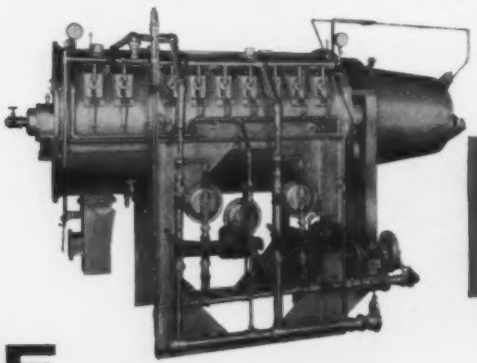
ROTARY RETORT AND RECIPROCATING HEARTH

for all small parts heat treating



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Model 136-M6D

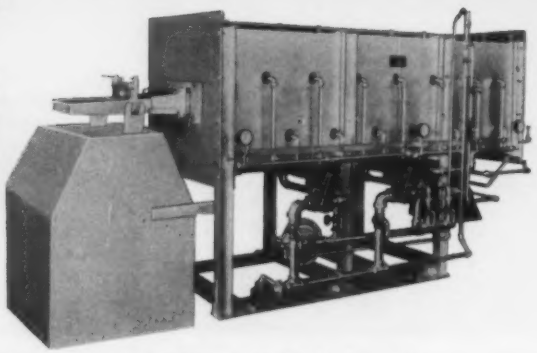
Medium size rotary furnace for the most economical heat treating of parts that can be subjected to a gentle tumbling (approximately ¼ r.p.m.).

Tumbling insures uniform heating and atmosphere contact.

AGF

Model 231

Medium size Shaker Hearth Furnace for the widest range of work, even light and delicate stampings. Momentum imparted to each work piece conveys it individually through the heat with no distortion or warpage.



Capacities to 800 lbs. per hour. Processing pieces from .010" to 1" thickness and up to 10" in length. Automatic continuous feeding reduces direct labor costs drastically! Clean hardening, ammonia-gas case hardening, light case carburizing of steel parts, etc., are accomplished equally well WITHOUT ANY MODIFICATION OF THE FURNACE.

The muffles and retorts are, in reality, radiant tubes WITHIN which the work and atmosphere gas is contained. Zoned combustion systems uniformly heat these muffle tubes from the outside to the desired temperature in each work zone. Control is precise, results uniform.

MODEL 136-M6D AND 231 ON DISPLAY AT THE METAL SHOW BOOTH NO. 728

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Making High Quality Steel—At Low Cost

The growing demand for steels of increasingly higher quality has created a new kind of thinking. With conventional methods of obtaining both high quality and quantity being relatively slow, costly and often uncertain, more and more mills are turning to the modern Heroult Electric Furnace as the most reliable and economical means of making high-grade steel in large heats.

To keep abreast of this trend, Sharon Steel Corporation recently built a complete new Melt Shop at its Roemer Works in Farrel, Pennsylvania, and installed the large Heroult Electric Furnace shown above.

This 20′ diameter furnace turns out 90-ton heats of top-quality stainless in less than 8 hours. Space has been provided for a second Heroult when it is needed.

Moreover, electric furnaces are proving to be more efficient and economical in producing most *any* grade of steel in large or small heats. This is because electric furnace operations require a smaller investment, usually reduce both power and charging costs and produce a more uniform product.

American Bridge, exclusive manufacturers of the Heroult Electric Furnace, offers a complete electric furnace service. We have the facilities to handle the complete job—from foundation to furnace, from engineering to erecting. We are also prepared to modernize your old Heroult by installing improved new mechanisms that will increase the efficiency and productivity of your unit. And, if you own a Heroult, we can supply any needed replacement parts.

For more information, get in touch with the office nearest you. *USS and Heroult are registered trademarks*

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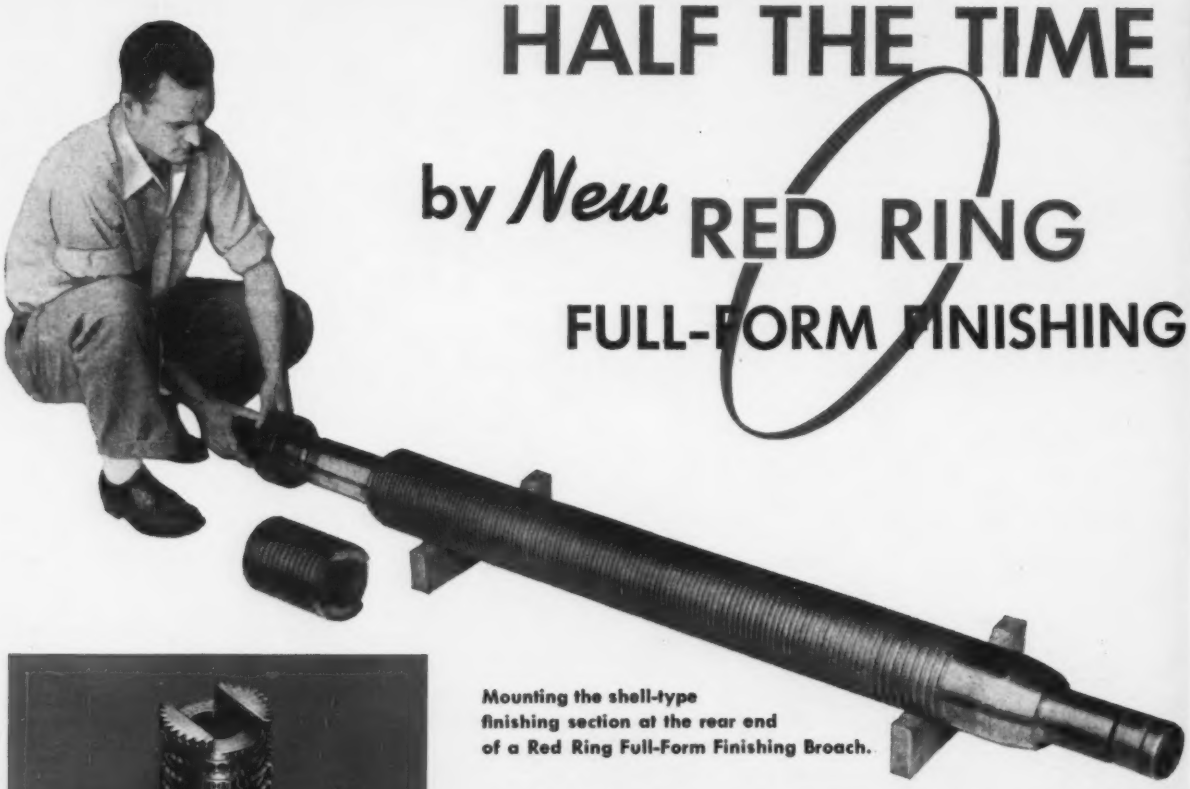
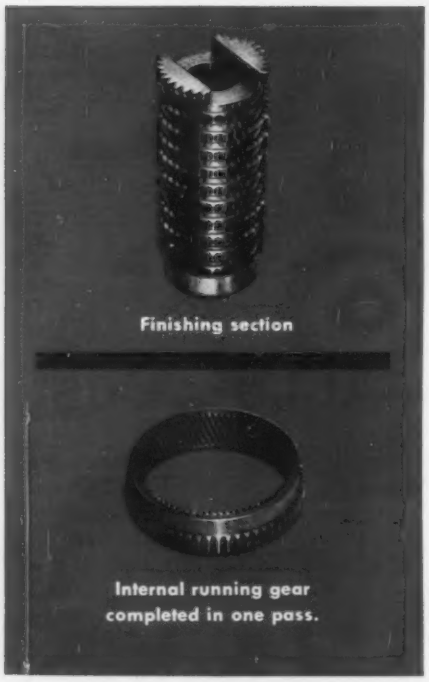
CLOSER TOLERANCE GEARS IN HALF THE TIME

by *New* RED RING FULL-FORM FINISHING



Mounting the shell-type finishing section at the rear end of a Red Ring Full-Form Finishing Broach.



Finishing section

Internal running gear completed in one pass.

An entirely new concept in broaching precision gears and splines for automotive and aircraft industries has significantly reduced production costs and at the same time materially improved gear quality. Both roughing and finishing are completed in a single pass of the tool.

Broached tooth surfaces are not only true to form but are entirely free of the generating tool marks which are unavoidable with conventional broaching tools. Surface smoothness checks out between 5 and 8 microinches in the direction of broach travel.

The secret lies in the ingenious design of this new Red Ring broach (patents pending). The roughing section generates gear teeth in the conventional manner. Following the roughing teeth is an interchangeable shell-type section having 12 rows of finishing teeth. Each row cuts about 0.00025″ of stock on the full profile of each side of the gear teeth—hence the remarkable tooth surface smoothness attained.

Using this method on a 3.5″ PD, 35 tooth internal running gear, a prominent transmission builder found broach life of the roughing section to be 50,000 work pieces—that of the finishing section, 150,000 pieces.

Write for specific data regarding the application of Full-Form Finishing to your operations.

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Announcement

New Britain's new and completely modern Rebuild-Retool Center at Bridgeport, Michigan, is important to every present and prospective owner of New Britain Automatics.

This is the first center established exclusively for the rebuilding and retooling of production machinery. It is staffed by men trained specifically for this type of work. It is equipped specially for putting New Britains back on the job with maximum efficiency in minimum time, at minimum expense to the owner.

Rebuilding and retooling may be "orphan jobs" elsewhere, but they rate top treatment at New Britain. Here is an important extra reason for selecting a New Britain when you purchase new equipment—a full time specialist organization devoted to protection of your investment.

If you would like to investigate the profit potential in a complete modernizing program, or could profit from a factory-engineered retooling of one or more machines, write us either at New Britain, Connecticut, or Bridgeport, Michigan. The New Britain Machine Company.

DURA-PLATE INCREASES DURABILITY OF CHROME-PLATED PARTS BY OVER 50%

Dura-Plate, the new Brown-Lipe-Chapin process, gives chrome-plated parts a new dimension in durability.

New Dura-Plate consists of a duplex nickel base *plus* a thicker layer of crack-free chromium. Two-thirds of the initial layer is semi-bright nickel which is columnar in structure. The remaining one-third layer is bright nickel with a laminar structure. On top of this is a layer of chromium up to five times normal thicknesses. Together these three elements provide a higher degree of resistance to corrosion than has ever been achieved by conventional processes.

After 18-hour CASS Tests and actual field surveys with Dura-Plated parts, results showed that these parts resisted corrosion up to 50% more than companion parts plated by conventional methods.

The brilliance of Dura-Plate plus its outstanding resistance to corrosion adds important sales advantages to consumer products and opens up new applications for chrome-plated parts.

OUTDOOR LIVING: Dura-Plated parts can withstand the rigors of the most severe climate conditions, making it ideal for outdoor furniture, grilles, and outdoor-living accessories.

APPLIANCES: The lustrous brilliance of Dura-Plate parts provide extra sales appeal to ranges, refrigerators, toasters, washers and dryers. Grease detergents and other household cleaning agents will not mar the beauty of parts plated with Dura-Plate.

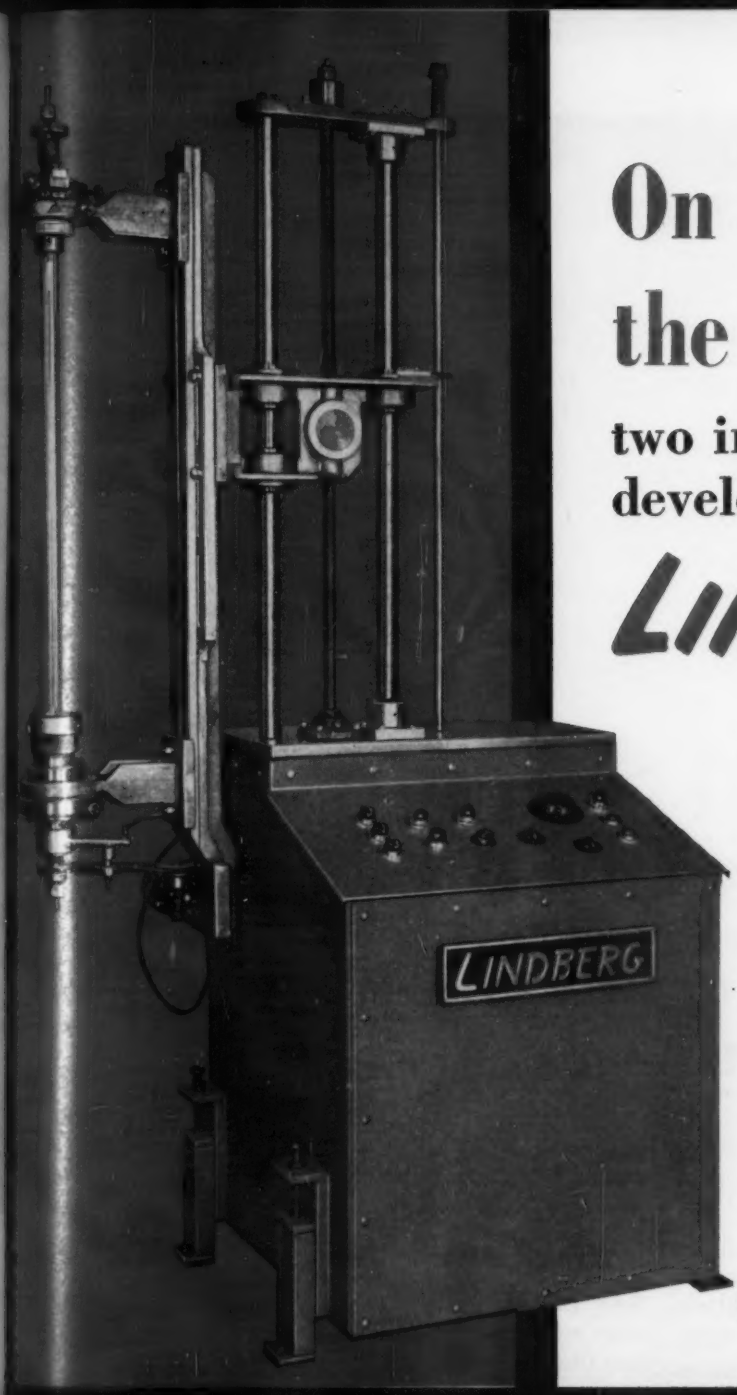
AUTOMOTIVE: Sparkling trim of Dura-Plate will stand up under the punishment of salt, snow and water, providing longer lasting protection for the beauty of automotive bright work.

In addition to Dura-Plate, Brown-Lipe-Chapin offers mass production facilities for die casting, all metal stampings, anodizing, rolled sections, polishing and painting. For further information, call or write Brown-Lipe-Chapin, Syracuse, New York.

GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION



On Exhibit at the Metal Show...

two important new developments by

LINDBERG

Visit Lindberg Booth 520 at the Metal Show and see these latest developments by Lindberg engineers.

The New Lindberg Floating Zone Scanner (shown at the left) has been expertly designed to provide more accurate and precise production of high purity semi-conductors and metals. It is an ideal tool for metallurgical research and production of semi-conductor devices.

The new high temperature Graphite Tube Furnace, (shown below) has been developed to meet the demand for higher controlled temperatures for research and small production in the metallurgical and ceramic fields. Its temperature range of 1600° F. to 5000° F. makes it ideal for sintering of powdered metals, firing of ceramic bodies and high temperature chemical reactions.

LINDBERG **heat for industry**

For full information on the new Floating Zone Scanner ask our High Frequency Division for Bulletin No. 1600.

For full information on the new Graphite Tube Furnace ask our Pilot Plant Equipment Division for Bulletin No. T-1084.

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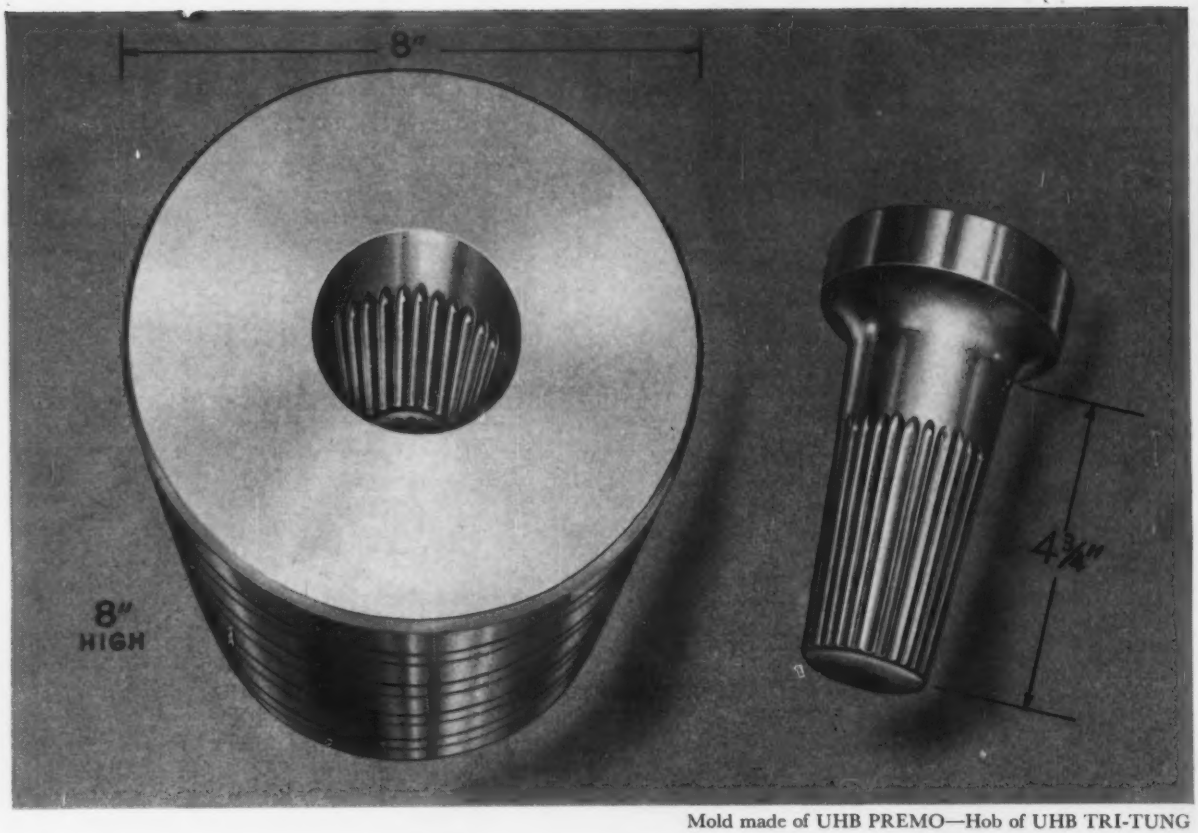

Mold made of UHB PREMO—Hob of UHB TRI-TUNG

This Plastic Mold Was Cold Hobbed Without Annealing!

This mold made from UHB PREMO, a 5% chrome-type plastic mold steel (SAE P4), is used for molding plastic containers (Polyvinyl Chloride).

Because UHB PREMO is extra low in carbon content, very soft in its annealed state, and has truly outstanding sinking properties, the hobbing of this mold was done in four stages with *no annealing between stages!*

When hardened and tempered, UHB PREMO has an excellent wear resistant case—a high core hardness, (Brinell 250-300 depending on size) which provides good resistance to sinking, and it also polishes to a mirror-like finish with a minimum of effort. The mold blank was approximately 8" high by 8" diameter—the cavity is 4-11/32" deep. Hobbing was done with ram speeds of 0.05" to 0.06" per minute.

This mold was cold hobbed with a hob made of UHB TRI-TUNG, a high-carbon, high-chrome steel (SAE D6). The hob was copper plated between stages and lubricated with "Molykote", (Molybdenum Disulfide powder and SAE 10 oil).

There are more than 2800 different types, grades and sizes of Uddeholm Tool Steels available from warehouse stocks, which will give equally good results for their recommended applications.

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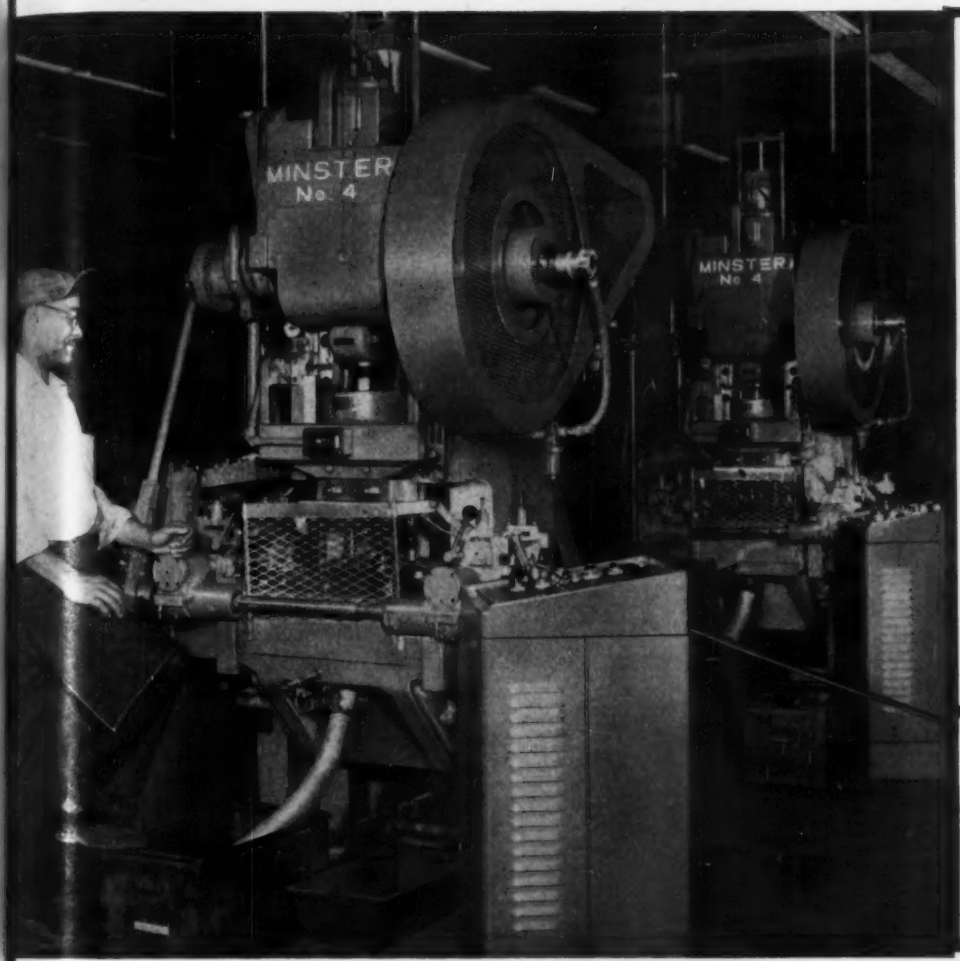

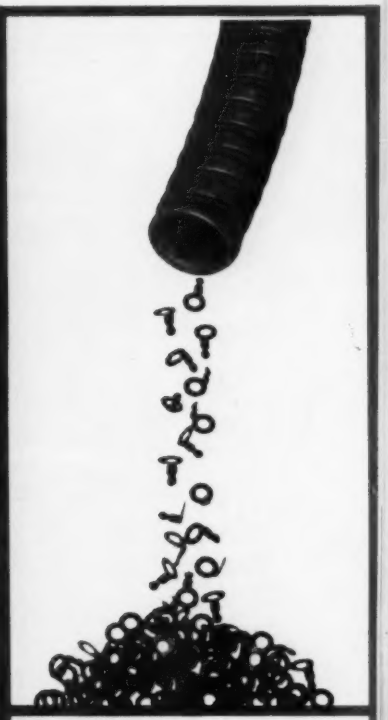

Minster O.B.I.'s ranging from 12 to 110 tons capacity give superior performance on automatic production because of close bearing clearances, heavy, rigid frames, precise gib fitting and fast controlled action of the Minster clutch and brake.

Photos courtesy of Automatic Electric Company, North Lake, Illinois.

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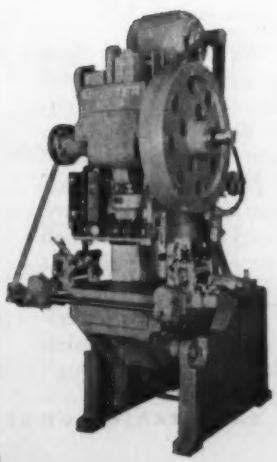

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The eleven Wean shearing lines illustrated process all the cut-to-length tin plate output at the Weirton plant of Weirton Steel Company, Division of National Steel Corporation. The lines incorporate the functions of side trimming, edge conditioning and inspection, as well as shearing to close tolerances at high speeds.

Wean has had extensive experience in the continuous processing of tin plate from cleaning, through annealing and electrolytic tinning to inspection and cut-up. Most of the industry's tin plate facilities have been designed and built by Wean.

Wean's leadership in this field is the result of its close working relationship with the steel industry. Throughout this partnership, Wean's *creative engineering* has helped translate laboratory developments in continuous steel processing techniques into full-scale production installations.

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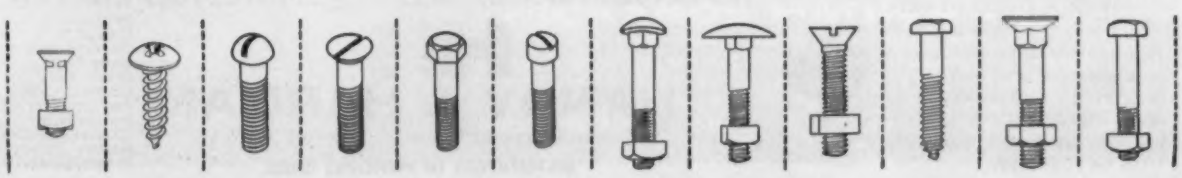
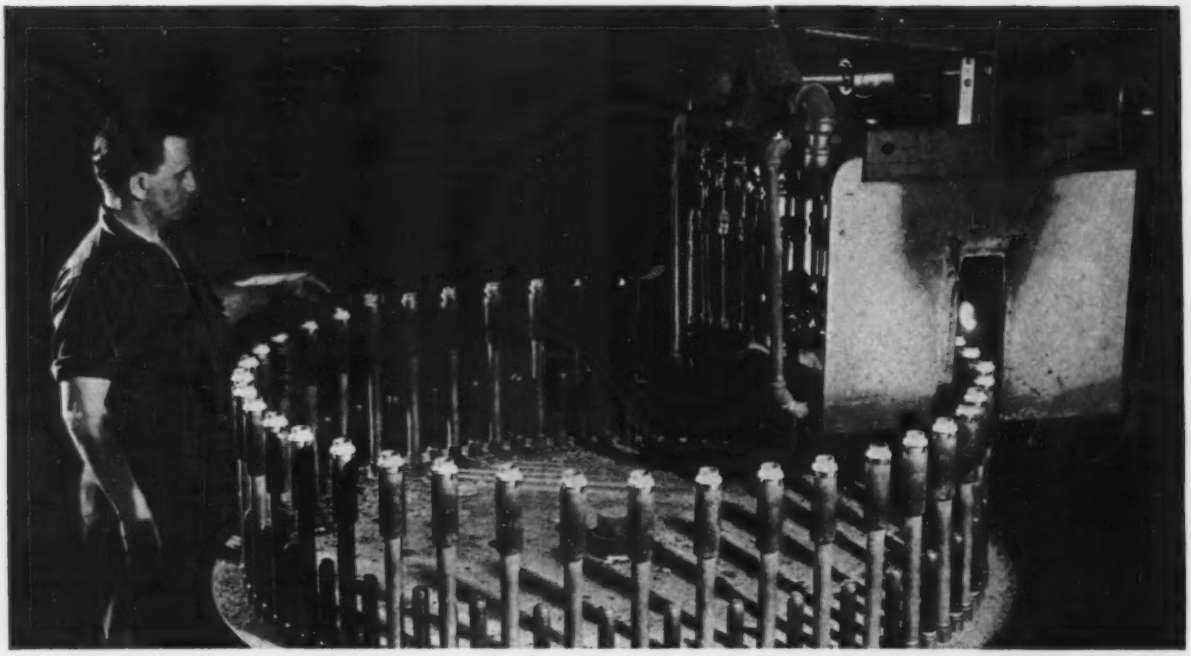


Every Hour M. S. Little Brass Goods Company Makes 650 Appliance Fittings Better With **HANDY & HARMAN SILVER BRAZING**



Rotating jig showing mounted assemblies entering and leaving gas-air furnace.

Left– brazed assembly. Right– components with preform ring of EASY-FLO *45.*

This Hartford, Connecticut, company makes—in volume—an assembly that goes into the overflow system of household appliances. The assembly consists of brass tubing and a machined brass casting. The two components are joined by a preplaced ring of Handy & Harman EASY-FLO 45 silver brazing alloy and HANDY FLUX. Heating is automatic gas-air; parts are placed on a rotating turntable to pass through the gas furnace. Every 60 working minutes, 650 assemblies are completed.

The advantages here are that the manufacturer can use thin-walled tubing with heavier, threaded components at no sacrifice in strength. Because of EASY-FLO's penetrating qualities, the entire shear area is fully as strong as the solid parts of the assembly, yet considerably lighter. And, casting and machining the components for this assembly have been greatly simplified.

Are you in pursuit of a metal-joining method which offers—among other advantages—high, uninterrupted production at low capital investment? You may easily find the answer in Handy & Harman silver brazing. Hundreds of manufacturers and fabricators of as many different products, parts and components are right now enjoying the speed, economy, strength and *flawlessness* of brazing. You can too. Just ask Handy & Harman, 82 Fulton Street, New York 38, N. Y.

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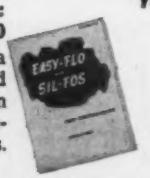

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Finkl vacuum degassed steels are cleaner. About 50% of the nonmetallic inclusions have been removed. Machineability is improved, with higher lusters obtainable in die block impressions, if desired. Fewer tool regrinds are required.

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Finkl vacuum degassed steels promote high density centers in large die blocks and forgings therefore reducing the possibility of late shipment because of ultrasonic rejection.

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For over 80 years Finkl has been producing top quality products. Now with the introduction of vacuum degassing of our electric furnace steels we have the most complete control of quality which enables us to offer the finest in die blocks, hot work die steels and flat die forgings. Call your Finkl representative.

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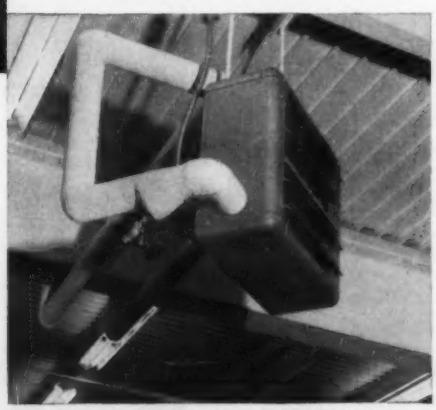
"Buffalo" Breezo-Fin Unit Heaters are your "best buy" for "spot-heating" applications in plants and commercial buildings. Flexible, economical and dependable, they are delivering peak performance in thousands of installations throughout the world.

Best of all, *leakage inside the unit is positively eliminated.* A one-piece, seamless copper tube extends from inlet to outlet ground joint. This provides absolutely leak-tight operation for steam pressures up to 250 pounds and 406°F. Special coils for higher pressures and temperatures can be furnished, on application, utilizing steam or hot water.

Other Breezo-Fin features include high-efficiency fans for quiet operation — streamlined, handsome appearance — fins designed for maximum radiation — sturdy construction for long, maintenance-free life — adjustable louvers to "spot" the heat exactly where it's needed. Available in 31 standard sizes from 16,000 to 497,000 BTU. Special larger packages also available for higher heating loads.

Be sure to investigate "Buffalo" Breezo-Fin Unit Heaters for *your* next "spot-heating" job. Contact your nearby "Buffalo" engineering representative, or write us direct for Bulletin 3137-E.



One of many "Buffalo" Breezo-Fin Unit Heaters installed in world's largest surgical dressings plant, equipped with special coils operating on 425°F hot water with 400 P.S.I. working pressure.

"Buffalo" products bring you the "Q" Factor—the built-in QUALITY that provides trouble-free satisfaction and long life.

BUFFALO FORGE COMPANY

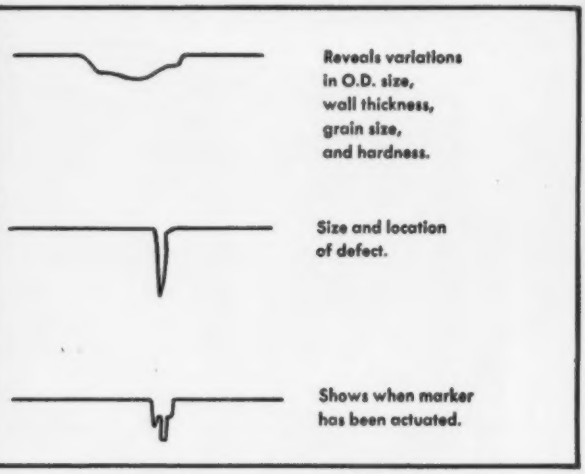
BUFFALO, NEW YORK

Buffalo Pumps Division • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

NEW DAMASCOPE TEST


Reveals variations in O.D. size, wall thickness, grain size, and hardness.
Size and location of defect.
Shows when marker has been actuated.

This flaw is .004 square inches in area
Damascope revealed exact size and location

Here is a new and improved method of eddy current inspection that guarantees each and every piece of Damascus pressure tubing will meet your specifications. Damascope reveals not only the presence of flaws, but their exact size and location. Tubes with surface or sub-surface cracks, seams, splits, holes and inclusions are automatically indicated and rejected.

Over one million inspection feet were run to prove the new test which Damascus now employs as a regular production check on pressure tubing quality.

DAMASCOPE "Eddy Current" Test Meets ASTM Area Size Limits on Flaws

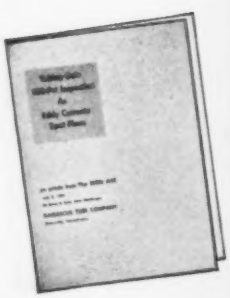
Gauge	Wall Thickness (in.)	Minor Dimension of Defect (Length or Depth) (in.)	Area Size Length x Depth (sq. in.)
20	0.035	0.005	0.0020
18	0.049	0.006	0.0024
17	0.058	0.007	0.0028
16	0.065	0.008	0.0032
15	0.072	0.009	0.0036
14	0.083	0.010	0.0040

Tubing passed by Damascope is guaranteed to meet A.S.T.M. specifications as outlined in the Book of Standards, Part 1, covering ferrous metals.

If you employ more stringent requirements, Damascope can be set to even finer sensitivity to yield a super tube at only a slight premium.

SUITABLE FOR NUCLEAR WORK

For nuclear or other critical applications, Damascope can be even more closely calibrated to yield a tube of super quality. Damascope is powered by batteries which eliminate the variable effects caused by current surges. It also employs modulation analysis to separate eddy current signals from background interference.



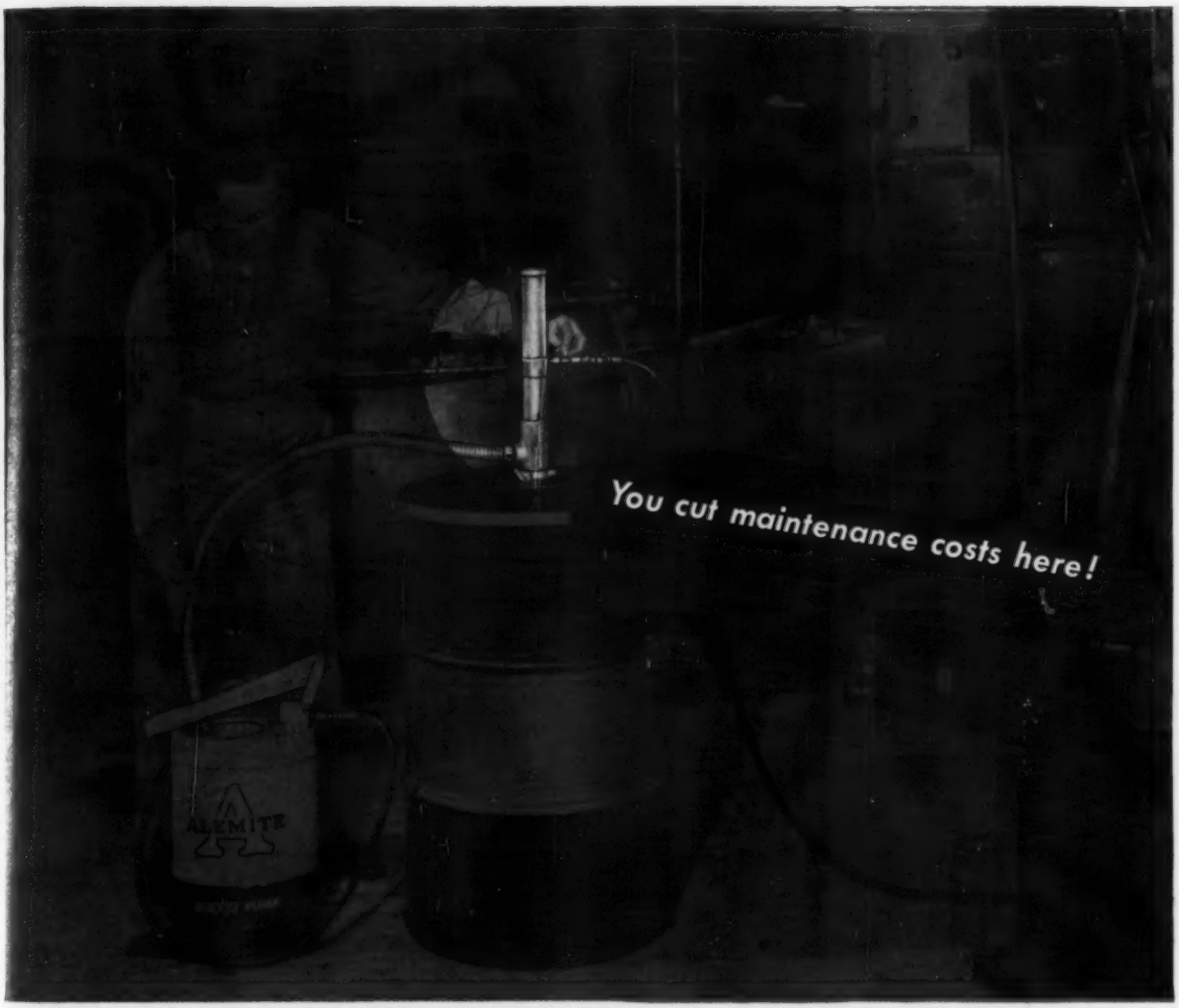
FOR COMPLETE INFORMATION ON DAMASCOPE TESTING

Write today for four-page bulletin explaining operation and other pertinent data on Damascope inspection.

DAMASCUS TUBE COMPANY

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA



Alemite Power Transfer of Lubricants Is 63% Faster Than Hand Method!

Wherever old-fashioned hand methods are used to transfer lubricants from original drums to other containers, time and money are wasted!

This high-speed, air-powered Alemite Transfer Pump transfers 37 pounds of pressure gun grease per minute, direct from original drum to loader pump, bucket pump or power gun. This gives you 63% faster transfer than by hand! And lubricant is always sealed—fully protected against mess, waste and contamination.

Pump also handles alcohol, cutting oils, kerosene—almost any non-corrosive, non-abrasive fluid used by the drum. Synthetic rubber air piston requires no oiling. Fully adjustable delivery rate . . . weighs only 15½ pounds!

Step up to fast-moving, time-saving transfer of fluid and semi-solid materials. Check Alemite's complete line of lubrication equipment for industry.

Symbol of SW Excellence

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DIVISION
STEWART-WARNER

1850 Diversey Parkway, Chicago 14, Illinois

MAIL COUPON FOR COMPLETE INFORMATION!

Alemite, Dept. G-109
1850 Diversey Parkway, Chicago 14, Illinois

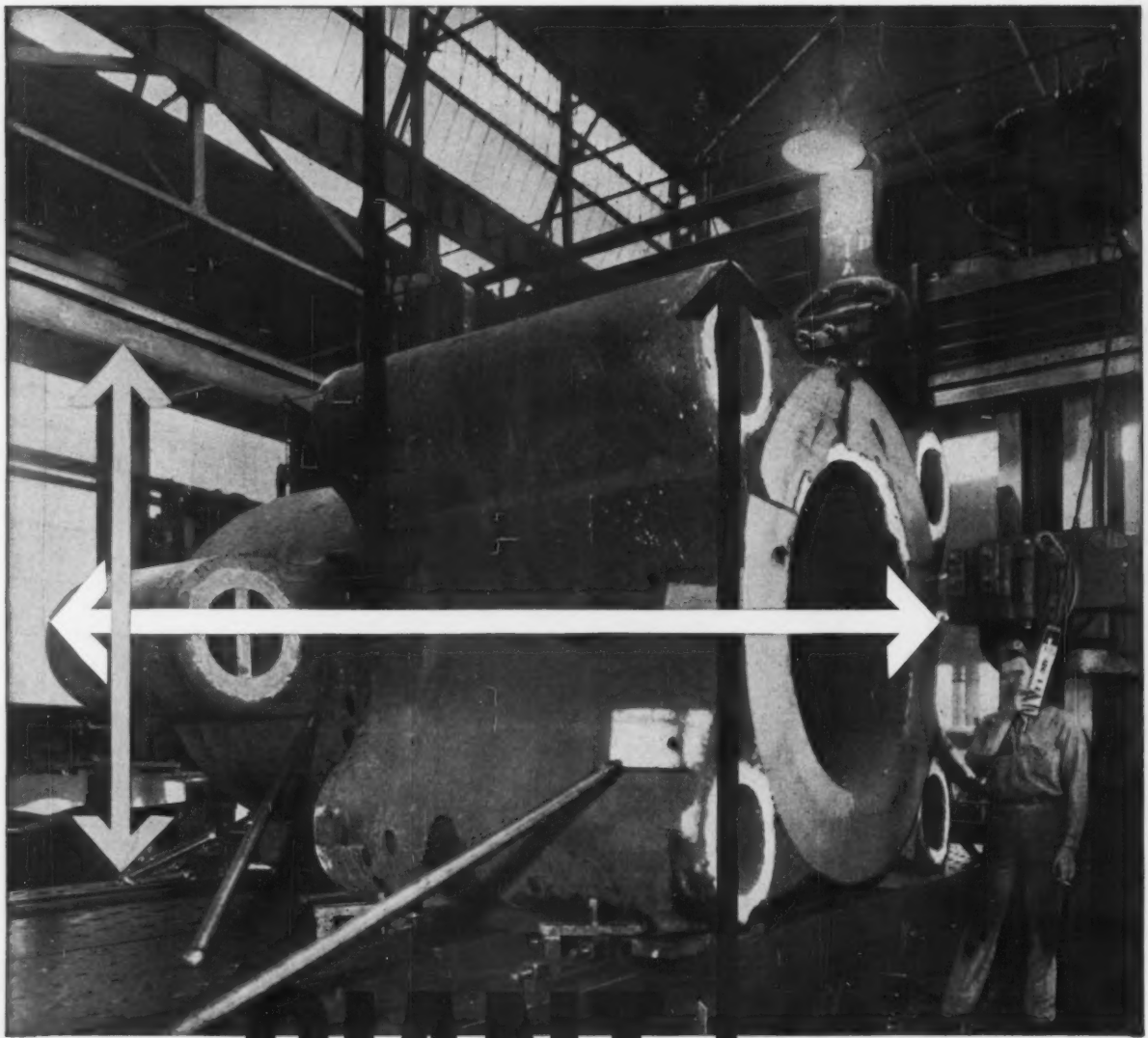
Please send me your complete catalog of Alemite industrial lubrication equipment.

Name .....

Company .....

Address .....

City ..... Zone ..... State .....



GIANT

IN THE MAKING

Machining a giant press cylinder ... The machining of this huge casting or the building of a complete machine, large or small, is the type of machine work regularly performed in SUN SHIP machinery plant where marine and industrial machinery is built.

We solicit jobbing machine work. Inquiries to our Sales Engineering Department will receive prompt attention.

Sun

SHIPBUILDING & DRY DOCK COMPANY

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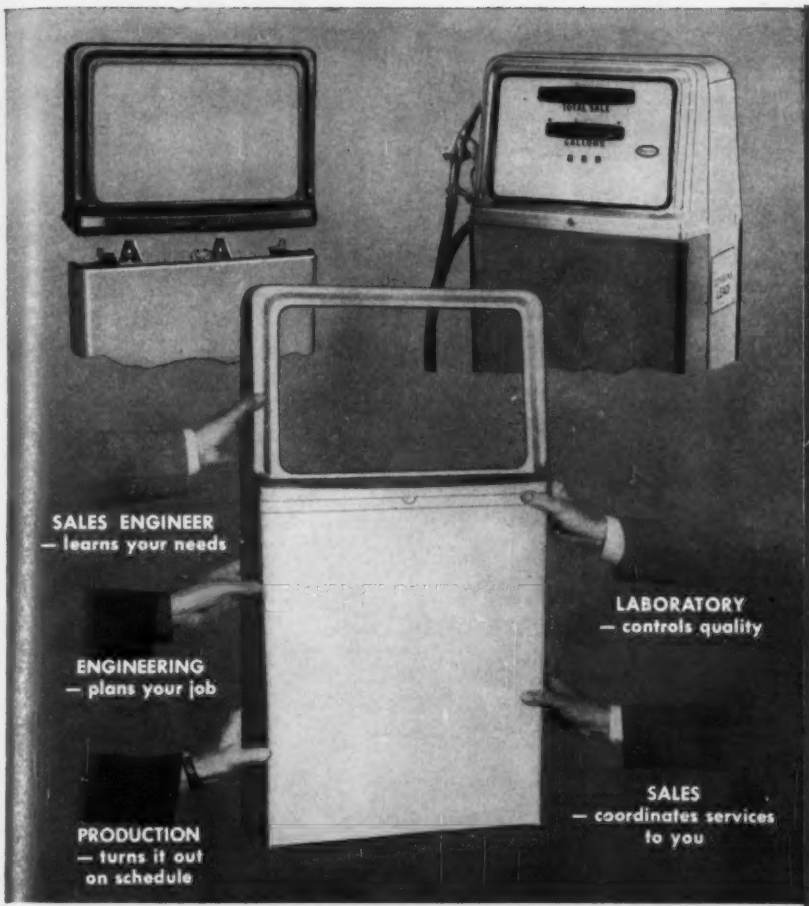

STAMPED Pump Housing Door, shown at left, is produced by T & W from 18-gauge cold rolled steel, or 0.050-gauge aluminum. It is 25⅜" wide, 45½" high, 5¼" deep, assembled. T & W welds on the stamped corner brackets and latch fittings, shown in the background of the illustration (A).

FORGED Diesel Connecting Rod, 16 inches long, produced by T & W Technique to hold to the exacting weight tolerances of 6 ounces, and to give a metallurgical structure of desirable machinability, and still maintain required strength and toughness for the application.

• • •

Write for 20-page book "Transue & Williams Challenges the Future" explaining how T & W Technique produces forgings and stampings that cost you less at your point of assembly.

MANY HANDS MAKE *BETTER* WORK

Every inquiry, every order you send to T & W receives special attention from *each* of a battery of experts. The ideas, the supervision, the driving force of *each* one contribute, for the best results. Teamwork is an important part of T & W Technique — a way of producing forgings and stampings for you so they usually cost you less at your point of assembly.

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TRANSUE & WILLIAMS
ALLIANCE, OHIO, U.S.A.

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COOPERATION

is a SPECIAL service

at Alan Wood

From the time you first call in your Alan Wood Representative till the cold rolled steel is in your plant, complete cooperation by Alan Wood assures you of the right cold rolled steel for your production requirements. For example, your Alan Wood Representative may suggest a metallurgical study of your situation. He has full information on cold rolled steel and its application, and his advice on type, gauge and size to order can help you eliminate production problems . . . cut costs . . . increase profits.

Call your Alan Wood Representative today! He's always available . . . and ready to help.

ALAN WOOD STEEL COMPANY

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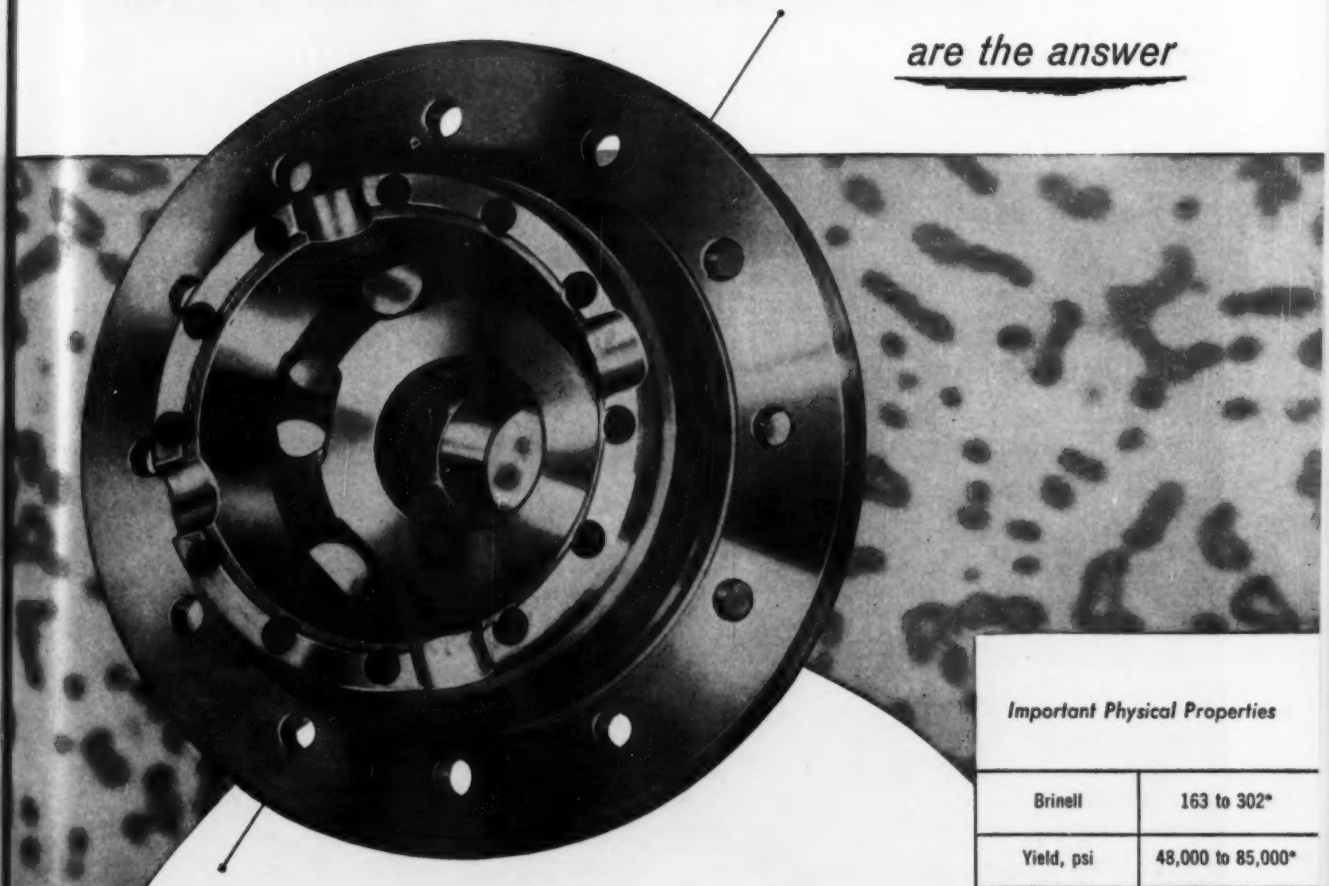
Montreal, Toronto and Vancouver, Canada—A. C. Leslie & Co., Limited

s your problem

machinability?

NATIONAL HTM CASTINGS

are the answer



There are many reasons for specifying HTM (Pearlitic Malleable) castings for your product. One is *machinability of 70-90 percent* (B1112 steel = 100).

But there are many other equally valid reasons. High ultimate strength . . . extreme wear resistance under heavy loads and high speeds . . . non-seizing qualities . . . air or liquid quenching . . . ability to be smooth-finished.

So when you're looking over the materials field, don't overlook the advantages of HTM castings. For HTM metal can be cast by either the shell mold, CO_2, or green sand methods. This means production costs tumble . . . performance and saleability of your product go up.

Important Physical Properties

Brinell	163 to 302*
Yield, psi	48,000 to 85,000*
Ultimate, psi	70,000 to 110,000*
Elongation, %	7 to 2*

*Depending upon grade

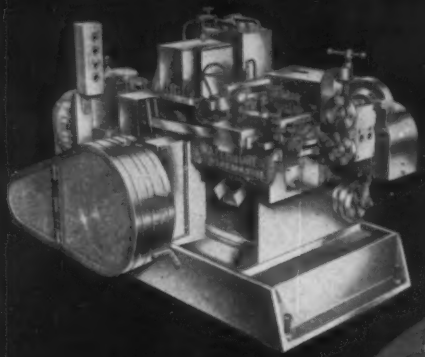
member STEEL FOUNDERS' SOCIETY CASTINGS COUNCIL

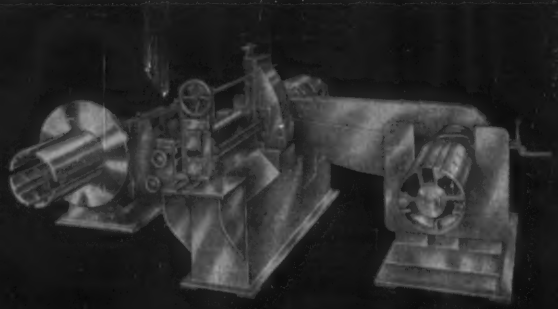
NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 — *Cleveland 6, Ohio*

The nation's largest independent producer of malleable and pearlitic malleable

COLD HEADING MACHINERY





EYELET, SLITTER & WIRE MACHINERY

WATERBURY FARREL

MACHINERY BUILDERS

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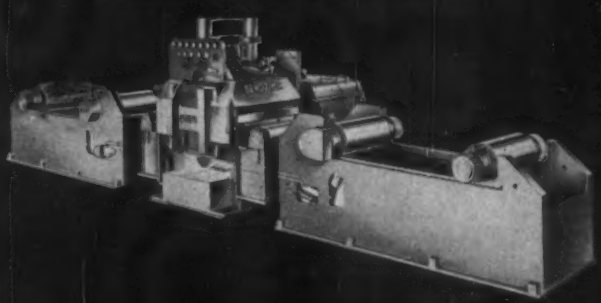

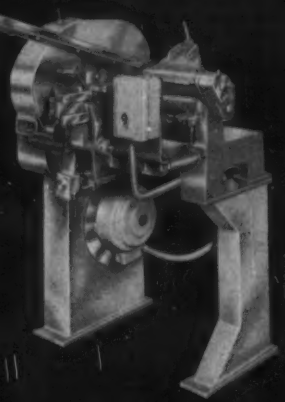

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THE WATERBURY FARREL FOUNDRY & MACHINE CO.
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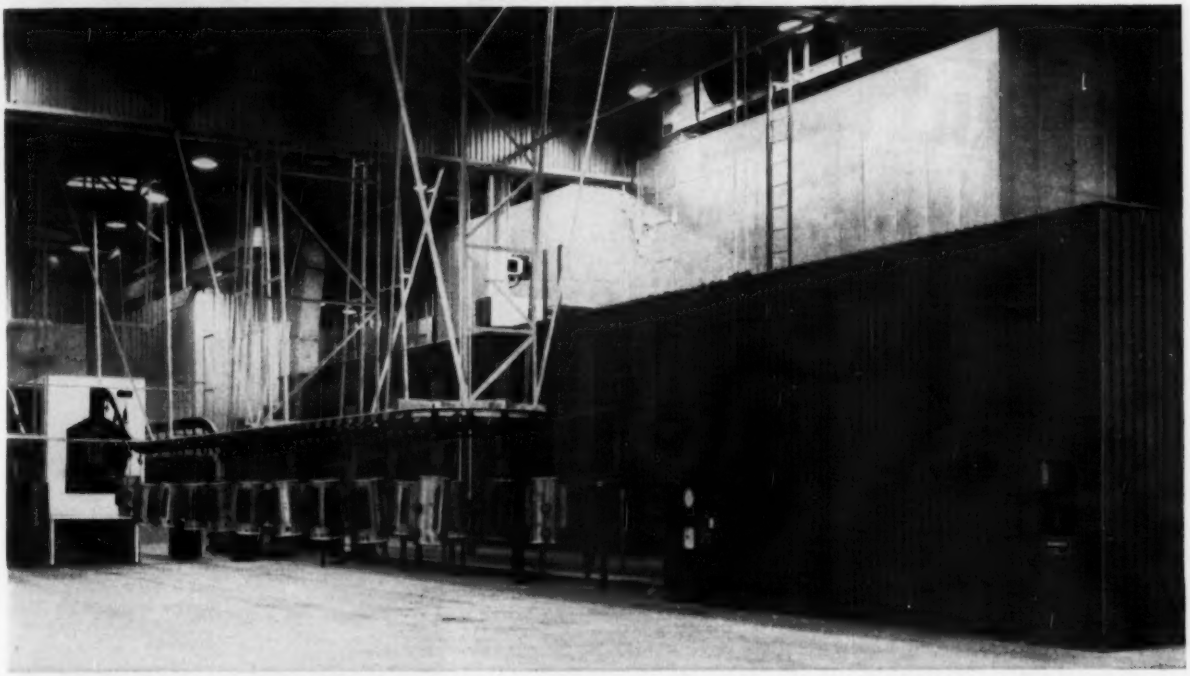
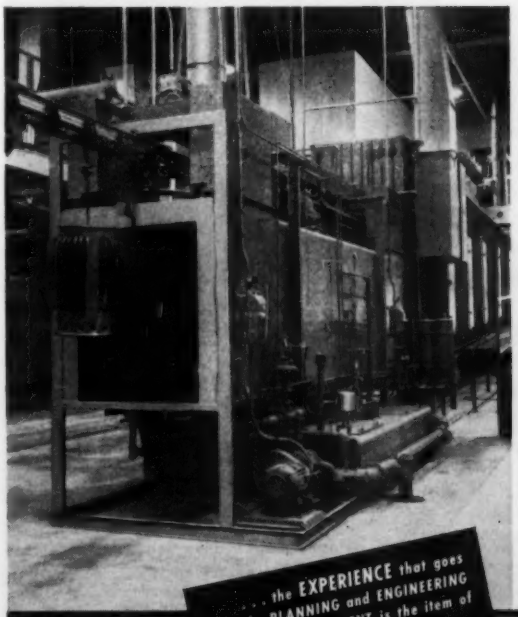
FINISHING SYSTEMS...



Mahon Combined Flow Coating and Spray Painting Machines Paint Transformer Tanks Automatically at Westinghouse!



. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

In a complete automatic Finishing System, recently installed by Mahon in the Westinghouse plant at Athens, Ga., transformer tanks with recessed bottoms are painted automatically, inside and outside, in an inverted position as they pass through specially designed, combined Flow Coating and Automatic Spray Painting Machines—tanks are rotated as they pass through the two simultaneous coating processes. Four coats of paint are applied and each is oven-baked on one continuous line that passes through Four Automatic Painting Machines—one is shown at left.

Other Mahon equipment in this Westinghouse plant includes a Transformer Coil Dehydrating Oven and a second Complete Mahon Finishing System for applying the final coat on completely assembled transformers.

If you are considering a new finishing system, or any unit of finishing or processing equipment, you will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the initial planning and engineering which plays such an important role in the ultimate operating efficiency of specially designed equipment of this type.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York, Chicago and Los Angeles

Engineers and Manufacturers of Complete Conveyorized Finishing Systems: Metal Parts Washers, Metal Cleaning and Rust Proofing Machines, Conveyorized Cleaning and Pickling Machines; Dry-Off Ovens, Spray Booths, Electrostatic Spray Enclosures, Flow Coaters, Dip Coaters, Finish Baking Ovens, and Paint Stripping Equipment; Core Ovens, Soldering Ovens, Dehydrating Ovens, Heat Treating and Quenching Equipment for Aluminum and Magnesium; Dust and Fume Control Installations, and Many Other Units of Special Plant and Production Processing Equipment.

See Sweet's Plant Engineering File for Information and Representative Installations, or Write for Catalogue A-659

MAHON

Bear in mind—it takes SKILL and EXPERIENCE to Heat Treat Metals . . . Your Commercial Heat Treater provides BOTH

It takes more than equipment, no matter how modern, to perform the complex heat treating processes required today to achieve the property specifications of many metals.

Without the proper combination of operational skill and technical knowledge developed by years of experience, even the most mechanical, up to date equipment can become a menace to your product and a destroyer of your business.

Today the commercial heat treating industry has definitely established its position as the source of skilled, experienced heat treating for all types of metals. Whatever your heat treating problem, always consult your commercial heat treater FIRST.

THERE IS A HEAT TREATING SPECIALIST NEAR YOUR PLANT

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Dominy Heat Treating Corp.
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Alfred Heller Heat Treating Co.
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Ipsenlab of Canada, Ltd.
Toronto, Ontario, Canada

Ipsenlab of Rockford, Inc.
Rockford, Illinois

L-R Heat Trading Co.
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Metallurgical, Inc.
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Kansas City 8, Missouri

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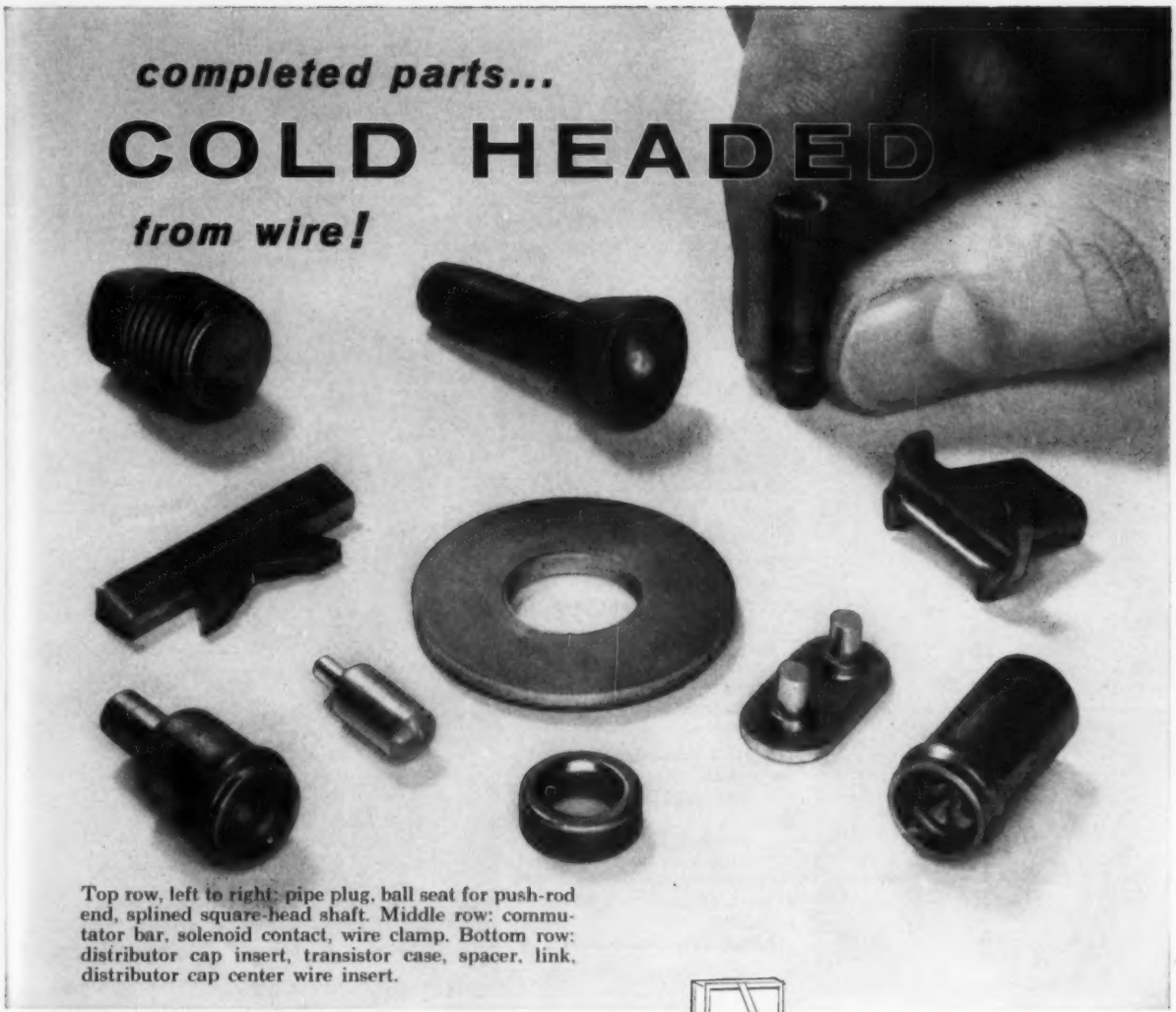


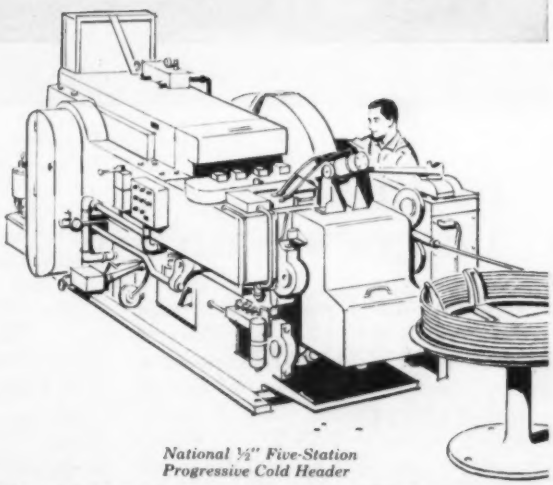
Top row, left to right: pipe plug, ball seat for push-rod end, splined square-head shaft. Middle row: commutator bar, solenoid contact, wire clamp. Bottom row: distributor cap insert, transistor case, spacer, link, distributor cap center wire insert.

All of the odd-shaped metal parts above were developed for fast, accurate production on National Cold Headers.

Complete and ready to use, these parts are made from wire, start-to-finish in one compact machine, at unbelievably high speeds with excellent die life, in most cases with no loss of material!

Production ranges from 40 parts per minute with stock of 1½" diameter up to 450 per minute in the ⅛" size. The jobs illustrated average 161 per minute.

Have you investigated Cold Heading? If you now have headers, have you considered widening your range and type of work to meet the growing requirements of metalworking?



National ½" Five-Station Progressive Cold Header

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

NATIONAL MACHINERY CO.

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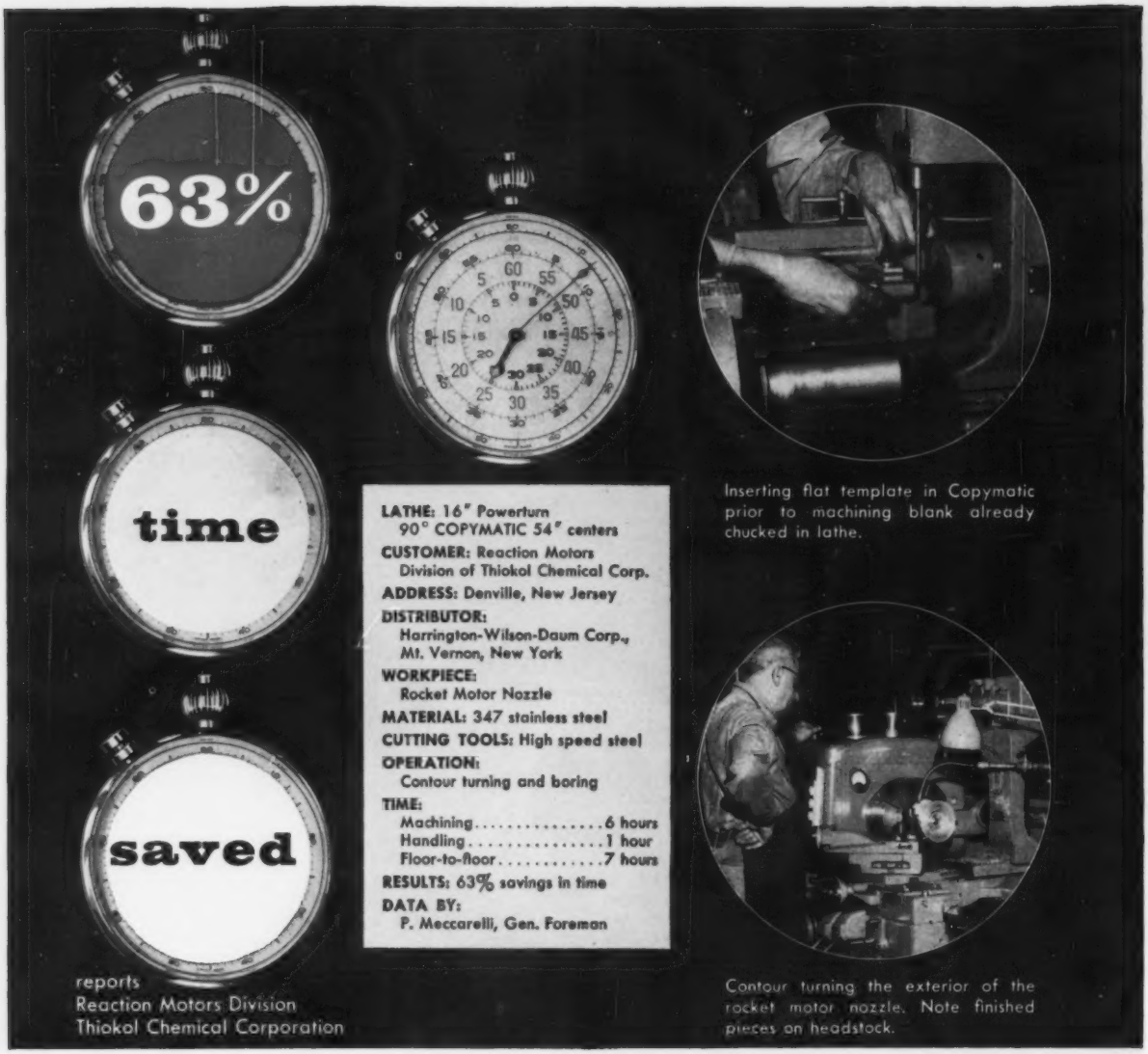
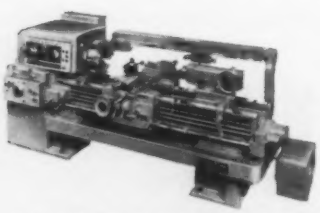


by this Lodge & Shipley Powerturn Copymatic Lathe



A pioneer in jet propulsion, Reaction Motors Division of Thiokol Chemical Corp., Denville, N. J., plays an important part in America's rocket defense and space exploration programs. In turn, and in turning, a Lodge & Shipley POWERTURN COPYMATIC plays an important part in rocket motor production.

In contour turning and boring a typical reaction motor nozzle, the COPYMATIC cuts 12 hours from the previous time, completing the job in 6 hours machine time and one hour handling time.

Whether you're machining the new and tougher alloys or the old stand-by metals, you'll appreciate the strength, rigidity and extra power available in Lodge & Shipley Lathes. For special jobs or routine operations, the speed and accuracy of these world famous lathes offers much to virtually any lathe user.

Investigate the time and money-saving possibilities of Lodge & Shipley COPYMATIC Lathes with 45° or 90° tracer slides. Contact your Lodge & Shipley representative or write for literature:
The Lodge & Shipley Company, 3073 Colerain Ave., Cincinnati 25, Ohio

More than ever before, your LODGE-ical choice . . . **Lodge & Shipley**

New Trend In Steel Buying: Many profit-conscious manufacturers taking a long, hard look at steel buying policies; more and more of them cutting costs by purchasing more steel *as it's needed and ready for production* from modern Steel Service Centers.

"We've cut delivery time 75%"

says Mr. W. M. Croft, California Drop Forge Company, Los Angeles, California

"U. S. Steel Supply's prompt deliveries help us keep this drop forge hammer busy."

"On one day's notice, U. S. Steel Supply furnished us with 80,000 pounds of hot rolled bars," says Mr. J. F. Armitstead, Shop Superintendent.

"Our normal delivery time used to be four or five weeks," says Mr. Croft. "Now, we offer 7-day delivery on orders, when necessary, because we're able to get the material we need from U. S. Steel Supply on an overnight basis.

"Recently, we faced this situation: One of our aircraft customers, through an accident, lost 65 parts from a 200-unit order; he notified us immediately, and we, in turn, called U. S. Steel Supply for the material. It arrived the next day, and a week later the re-order was completed. Our customer was impressed!"

Why not take a close look at *your* steel buying policies—you'll find U. S. Steel Supply's booklet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U. S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *steel.*

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U.S. Steel Supply Division of USS United States Steel

Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco. General Offices: 208 South La Salle Street, Chicago 4, Ill.

Two new ways to increase product appeal with richly textured M&T vinyl finishes

Adding the richness of a textured or patterned finish is a fast way to create a "deluxe" line without spending much extra money . . . if any. Two recent developments in M&T vinyl coatings make such appealing finishes particularly easy to adopt.

1. M&T Coating 6400 sprayed on smooth metal products gives a handsomely textured finish, with a warm, leather-like appearance.

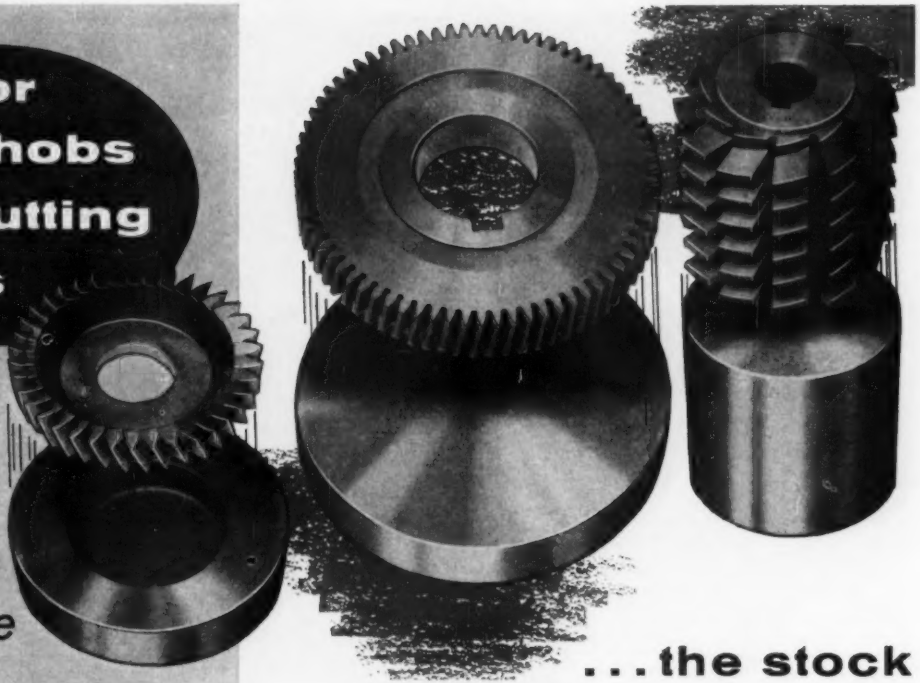
2. M&T Coating 6440 sprayed on products fabricated from mill-patterned sheet metal faithfully mirrors even the most delicate metal pattern in thick as well as thin coatings.

Advantages? There are plenty. Sprayed vinyl coatings prove at least 10 times more wear resistant than baked textured enamel. And their inherent chemical resistance protects against stains and corrosion. Then there's the warmth to the eye and touch . . . the sound deadening qualities . . . the color possibilities. As for production, spraying the finished product eliminates expensive scrap loss; it also eliminates seam problems at all joints.

Ask the M&T Man about them . . . and about other quality M&T products to help you add more value to *your* products

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY

For gear hobs and cutting tools



Forgings and bars stocked in wide range of sizes...

...the stock you need when you need it!

LATROBE'S

fully-uniform DESEGATIZED®

HIGH SPEED STEELS

- Electrite Double Six XL* (Type M-2)
- Electrite Tatmo XL* (Type M-1)
- Electrite Crusader XL* (M3 Type 2)
- Electrite Dynavan XL* (Type T-15)

*XL analysis for improved machinability. Grades shown also available in regular analysis

For stock sizes and technical assistance call your Latrobe representative today ... or write for latest stock list and data sheet

LATROBE Metalmasters / LATROBE STEEL COMPANY
LATROBE, PENNSYLVANIA

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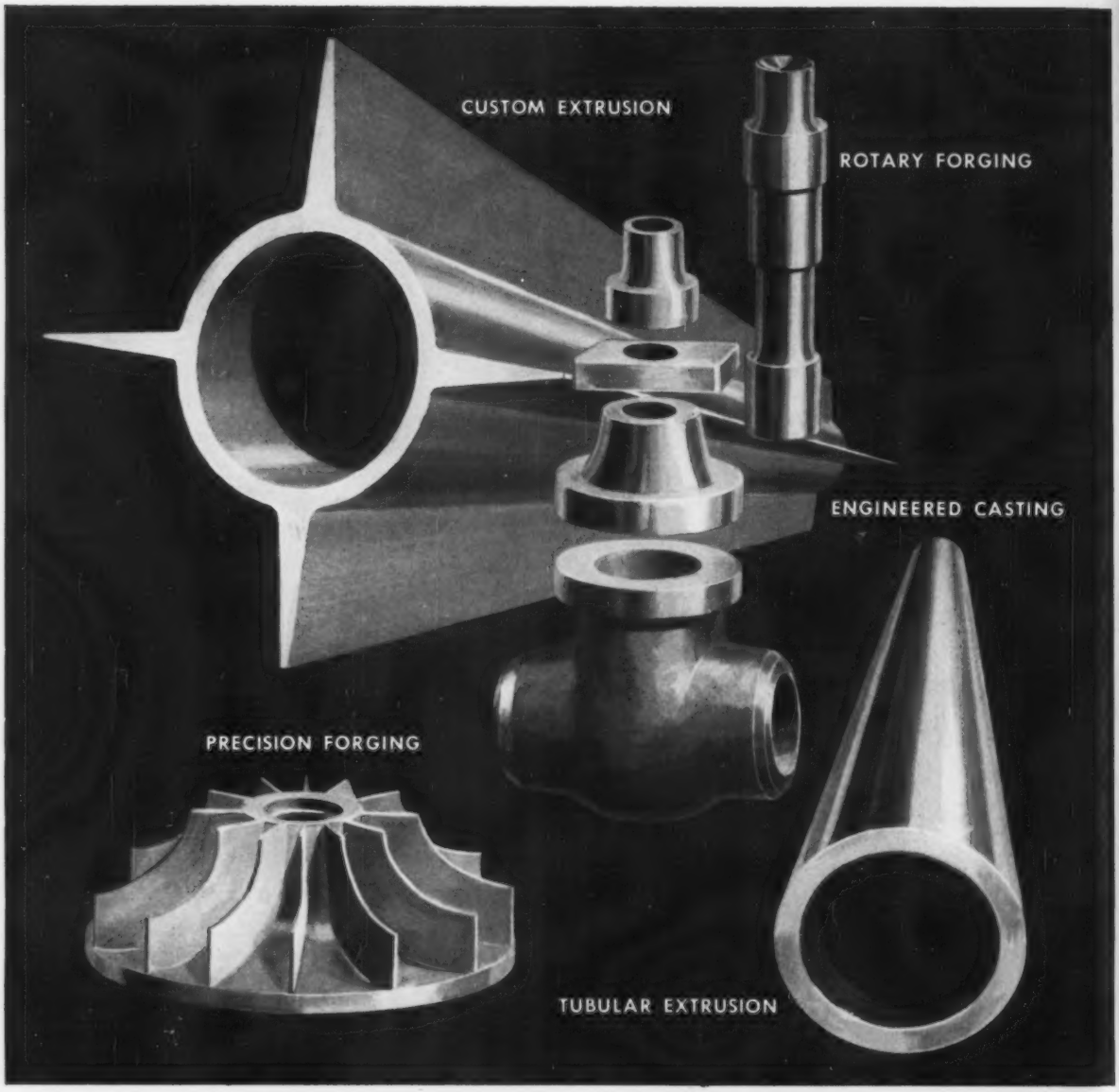
Be Sure to Visit BOOTH 1350 at the 41st National Metal Exposition



CURMET premium quality works for you in products like these

Curtiss-Wright Metals Processing brings out the best that an alloy can offer—steps up the performance of forgings, castings and extrusions—helps underwrite the performance of your product in use.

For example, exclusive CURMET rotary forging places the metal where it is designed to be on a stepped shaft, reducing chip production cost up to 50%. CURMET ceramic mold casting reproduces so closely to blueprint that non-machinable alloys can be cast, giving your product far greater wear resistance.

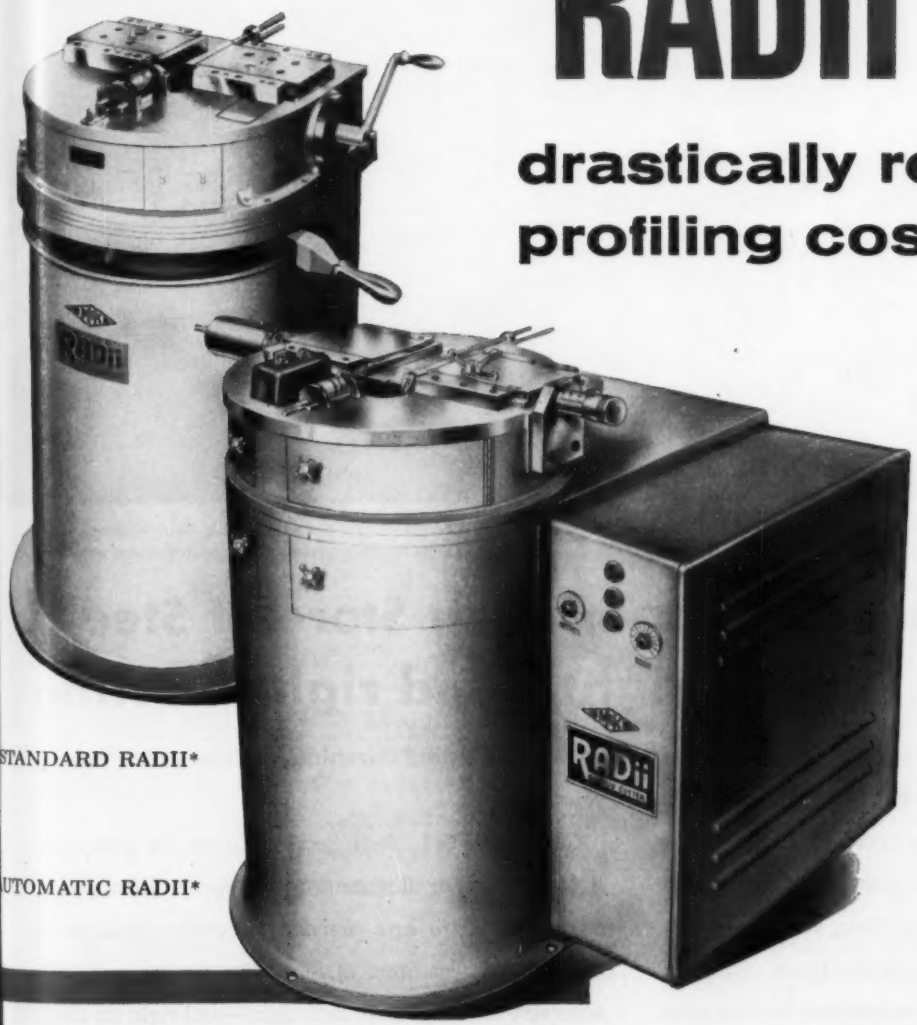
This is true with each of the CURMET precision methods for shaping hard-to-work metals. Further, production facilities are integrated . . . the large 40-foot stainless steel extrusions you require can be delivered heat treated to optimum strength level, the close-tolerance forgings you need can be finish machined and assembled . . . all within the CURMET one-source service.

To strengthen your product or process by putting premium quality to work for you, call the nearest CURMET representative or write for full information.

CURTISS-WRIGHT CORPORATION · 72 GRIDER STREET · **METALS PROCESSING DIVISION** · BUFFALO 15, NEW YORK

AMAZING McKAY RADII*

drastically reduces profiling costs!



STANDARD RADII*

UTOMATIC RADII*

Precision profile milling can now be accomplished in seconds with unskilled labor.

The amazing new McKay Radii will cut either simple radii or irregular shapes with no set-up or layout. The operator simply slips the material to be profiled into a simple vise and moves a handle through a 180 degree arc.

Available in either manual or pushbutton automatic models the Radii is modestly priced and requires less than 10 square feet of floor space and only standard shop electrical and air facilities.

For literature or further information on this outstanding cost-cutter write *McKay Machine Company, Youngstown 1, Ohio.*

*Radii is a trademark of the McKay Machine Co.

SEE IT AT THE METAL SHOW

Both the semi-automatic and automatic models of the McKay Radii will be in full operation at the Metal Show in Chicago, Nov. 2-6. Make a note now to see this revolutionary new machine in action.

OOTH 1843 EXHIBITION HALL

McKAY McK MACHINE

A typical view of a J & L shipping floor. Neatness is the keynote to well organized efficiency in shipping all orders.

Extra Care at "The Department Store of Steel" means your order's right—and right on time

● Anywhere you look, in any operation, you'll find *extra care* on the job at The Department Store of Steel. Take the neat, efficiently organized shipping dock as an example. Coils are moved with coil grabs, cold finished bars are handled with rope instead of chain, long structurals and heavy plate are raised with double hoists instead of single. All orders are carefully loaded onto modern steel carriers and skillful drivers deliver these orders right to your dock.

Call your J & L Steel Service Center for your next steel, stainless or aluminum requirement. Take advantage of the *extra care* practiced in every operation at The Department Store of Steel. See for yourself how *extra care* means your order's right—and right on time.

J & L Steel Warehouse Division

DIVISION OFFICES • INDIANAPOLIS, INDIANA

CHICAGO • CINCINNATI • CLEVELAND • DETROIT
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NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH

J&L
The Department Store of Steel

SHRINKING STEEL SUPPLIES WILL REDUCE 1960 model car output for the first time this week. The auto industry's first assembly plant closed down last Friday (Chevrolet at Framingham, Mass.). But a rash of additional shutdowns will occur before the end of October, regardless of the strike's outcome.

ONE OF THE MOST ATTRACTIVE NEW MARKETS for automation equipment can be found in the U. S. Post Office Dept. Automatic mail handling, which will be installed widely throughout the 38,000 post offices, will create a large, new demand for the equipment to sort and handle the nation's mail.

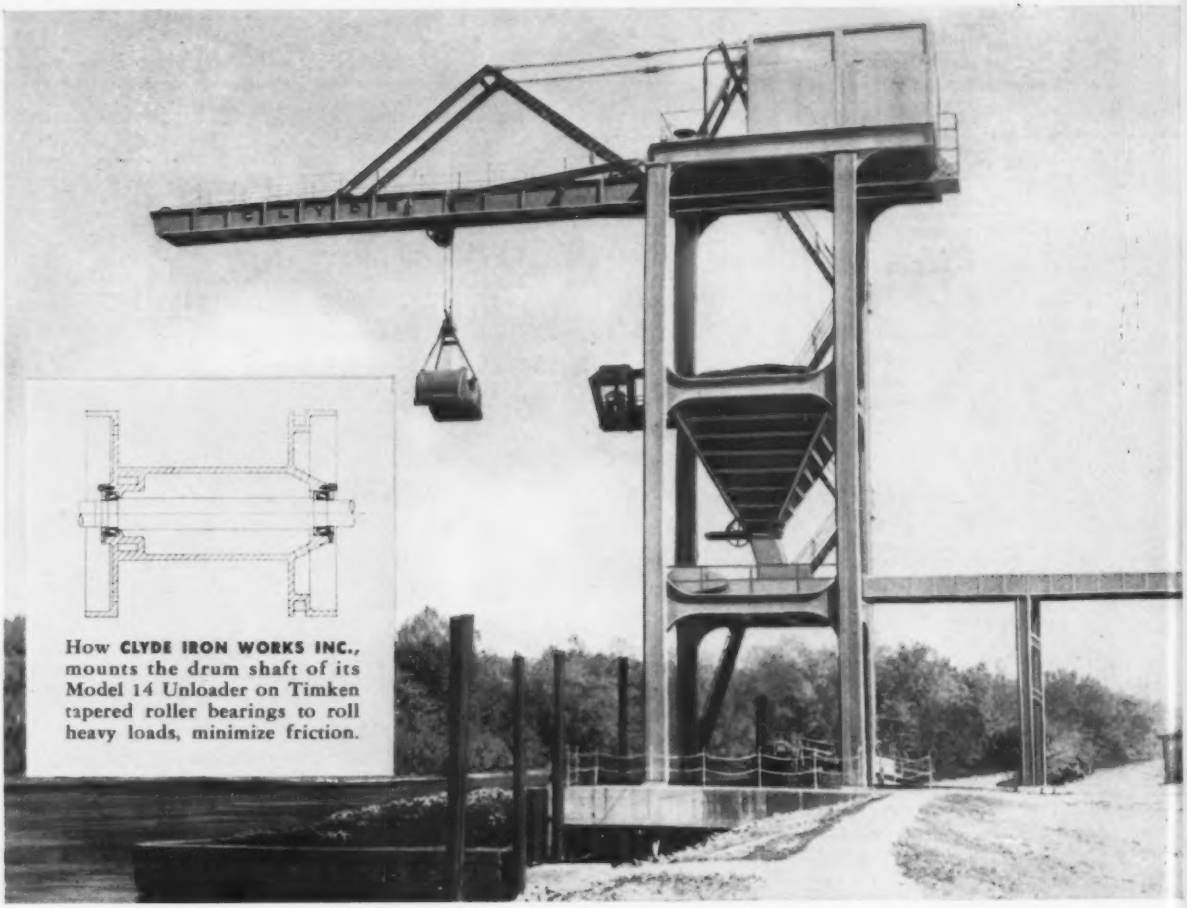
VOLUME OF ELECTRONICS BUSINESS IS GAINING more rapidly than even the industry optimists predicted. Sales of electronics equipment this year were estimated to hit about $8.5 billion. But revised estimates now put this year's volume at $9.2 billion. Industry experts believe the volume will hit $10 billion next year, compared with earlier estimates of $9 billion, and $15 billion by 1965.

LOOKING AHEAD TO THE FUTURE OF METALS, here are some conclusions of industry experts: Aluminum consumption will hit 10 million tons by 1987. Beryllium will make major gains, particularly in the missile and nuclear energy fields, with substantial price reductions ahead. Magnesium will enlarge its field with shipping of the molten metal by pipe directly from producer to consumer. Nickel base steel alloys will also grow in missile use.

THE NEXT CROP OF MISSILES will be of much smaller size than the present giants. Experts at the Society of Automotive Engineers aeronautic section believe that future ballistic missiles will be smaller, made of stronger and lighter materials, with lighter guidance systems, smaller warheads and better propulsion systems.

FEDERAL HIGHWAY FUNDS totaling $2.725 billion will be apportioned the states for the 1961 fiscal year. The advance notice by the Dept. of Commerce will give the states time to plan ahead for the period which begins July 1, 1960.

INDUSTRIAL PRODUCTION DROPPED slightly in September, probably will show a big drop in October because of the steel strike. The Federal Reserve Board's Index in September hit 148, seven points under June's pre-strike level.



How **CLYDE IRON WORKS INC.,** mounts the drum shaft of its Model 14 Unloader on Timken tapered roller bearings to roll heavy loads, minimize friction.

Clyde Unloader unloads 250 T.P.H. as 22 Timken® bearings roll the loads

UNLOADING coal barges at a 250 ton-per-hour rate puts terrific loads on the hoist drums and sheaves of the Clyde Model 14 Unloader. To roll the heavy loads steadily and smoothly, Clyde engineers mount the three drums and eight sheaves on a total of 22 Timken® tapered roller bearings.

Timken bearings have *extra* load-carrying capacity. That's because of full-line contact between their rollers and races. And the tapered construction of Timken bearings lets them take both radial and thrust loads in any combination. Because they're geometrically designed and precision-manufactured to roll true, Timken bearings practically eliminate friction. They reduce power loss, last longer; keep the drums and sheaves working smoother, steadier, with less maintenance.

To get all these advantages when you buy or build machines, specify Timken tapered roller bearings. Look for the "Timken Bearing Equipped" label. It's your symbol of Better-ness. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

First in bearings for 60 years

BETTER-NESS rolls on

TIMKEN® tapered roller bearings

CONFERENCE: Arthur A. Snow, director of Aluminum and Magnesium Div., BDSA, confers with top aides John Styer and Morris Bailkin on industry problems. Making notes is his assistant, Mary Banks.

Are You Using Your BDSA Div.?

Here's what the Aluminum and Magnesium Div., for example, can do for industry.

And in addition to its own facilities it has all the resources of the vast Commerce Dept. to call on.—By F. J. Starin.

▪ An aluminum fabricator went down to Washington recently to find a U. S. Navy blueprint for a new part he thought he could supply at a competitive price. He spent two full days in vain trying to run down the elusive bit of paper in the labyrinth of the Navy Dept.

Finally, almost in desperation, he called Arthur A. Snow, director of the Aluminum & Magnesium Div., Business and Defense Services Administration, in the Commerce Dept.

Part of Mr. Snow's job is to make his knowledge of the intricacies of government available to aluminum and magnesium people.

Mission Completed—In this particular case he was able to locate the blueprint with a single telephone call. It was on his desk when the fabricator called on him the next morning.

It may not be technically accurate to say that Mr. Snow's division of the BDSA is typical. Possibly some of the 25 divisions function more effectively. Certainly some not as well. But in a world where the word "bureaucrat" is not flattering, Mr. Snow and his staff seldom have that word applied to them.

In short, an analysis of the Aluminum and Magnesium Div. of BDSA can give an idea of what services and functions can be expected from the BDSA and its divisions. They are there to be used by business. Possibly too few businessmen realize what the functions are, and how they can get their taxpaying money's worth out of them.

Don't Ask on These—Not all problems are quite as simple for Mr. Snow and his staff of 12, as the elusive blueprint. For instance, Mr. Snow has been asked to compare aluminum with other materials for a specific use. And he has been asked for an appraisal of claims made for specific aluminum products. Such questions are not part of his job and are duly forwarded to a source in industry.

Also, the A & M division director steers very clear of any intra-industry controversy, particularly involving price. "We're not a trade association for industry in Washington," he says, "But we are here to help.

Ask on These—How can the Aluminum & Magnesium Div. help industry? Basically, in two ways:

(1) By supplying information on aluminum and magnesium marketing, market trends and analysis. It can supply helpful data on new products, new outlets or new busi-

nesses, establishing area sales quotas.

(2) By representing industry opinions to other branches of government. BDSA considers itself "a listening post as well as a sounding board."

Qualified—Mr. Snow, as head of the division, is well enough grounded in the metalworking industry to appreciate its problems. He was with Bethlehem Steel Co., and United Engineering and Foundry Corp. Part of his tenure with Bethlehem was spent in Washington on loan to the government. He helped set up the Aluminum & Magnesium Div. in 1951.

Mr. Snow's top assistants are John H. Styer, chief of products and facilities; and Morris Bailkin, chief of program and requirements.

Mr. Styer's job is to be thoroughly familiar with all aluminum production and fabricating facilities operating and planned, and the location and condition of markets. He is qualified by four years in government and nine years with Reynolds Metals Co.

Check the Files — Taking advantage of his files can save a company time and money. For instance, extruding has been one of the fastest growing segments of the aluminum industry. Some say it is overgrown, and the figures on the number of extruders that have failed or have been in financial trouble seem to bear this out. Yet Mr. Styer reports only one company came in to get the full market picture in the last few years, although it was easily available.

Mr. Bailkin is a statistician, has been in government for 25 years. He regularly compiles and publishes a wealth of charts and statistics on industry conditions. And he is a key man in the outlook studies the division regularly puts out. His statistics are considered the most complete in the industry because he has the most complete list of companies reporting to him.

If a request comes in for statistics he doesn't normally compile, and if the information isn't classified, he will do a special job. For instance, if he received a request for data on aluminum in packaging, he would huddle with the statistician for the Containers and Packaging Div. to come up with the information.

Togetherness—This shows that no division of BDSA is entirely alone, but can also call on any one of the other divisions, of any segment of the vast Dept. of Commerce, for related information.

Both Mr. Snow and Deputy Director H. Herbert Hughes stress that while BDSA still has defense functions, it is shifting its emphasis very notably toward civilian business and industry.

BDSA has 24 other industry divisions organized along similar lines as the Aluminum & Magnesium Div., and field offices in 33 cities to handle requests for information regularly compiled.

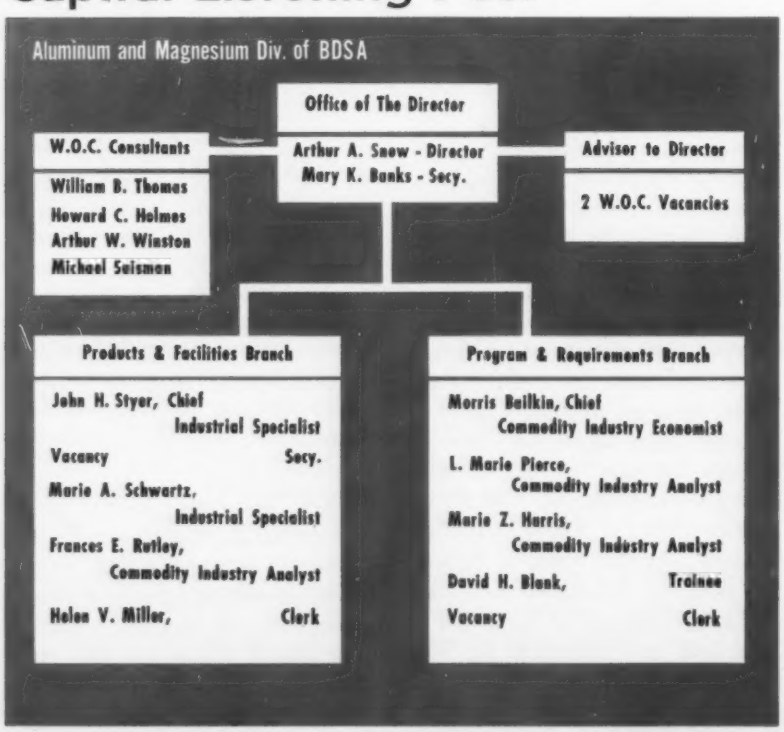
Mr. Snow can also help a fabricator obtain free licenses on government owned inventions, and advise on application of regulations where a defense contract is involved.

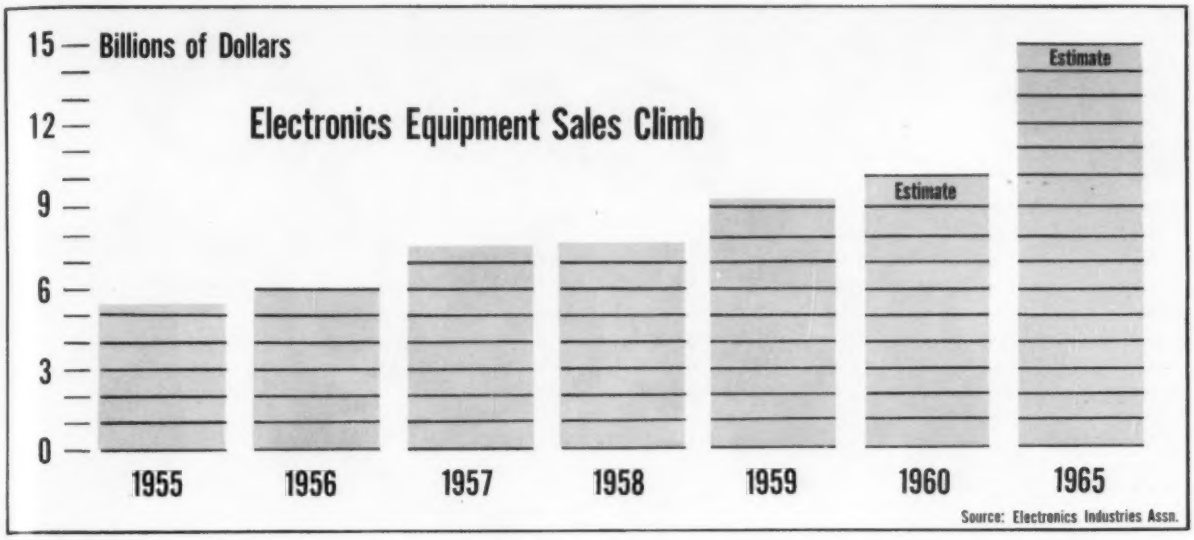
Exclusive Sources — For some market information, the Aluminum & Magnesium Div. has sources not available to other organizations. It regularly receives reports from foreign service officers stationed overseas on the condition of the aluminum industry and estimated demand in most countries of the Free World. It can also call on W.O.C. advisors (without compensation) from all segments of the aluminum industry.

Industry Spokesman — For example, the Office of Civilian and Defense Mobilization must decide how to dispose of surplus aluminum in Defense Production Act stockpiles without upsetting commercial markets. But it leans heavily on recommendations of A&M div.

This BDSA unit is also the prime mover in setting up the standards and specifications for aluminum and magnesium parts bought under defense contracts. And it supplies the basic data used to set up import and export policies on aluminum and magnesium.

Capital Listening Post





Electronics Having Record Year

The electronics industry will end 1959 with a new sales record.

Leaders in the industry say this is only the beginning. In the near future, sales will climb to even greater highs.

▪ Scratch one more 1959 sales forecast. The electronics industry, billed for a $8.5 billion sales year, will finish 1959 at a record $9.2 billion.

At least 4500 plants in the U. S. are turning out products ranging from missile guidance systems to portable TV sets at a record rate. The industry has now revised the entire long range forecast upward. Electronics men, who'd seen 1960 as a $9 billion year have already revised the figure to $10 billion.

The Uses—Where does it all go? Government and military needs will absorb $5 billion in electronic gear this year. Industrial use of electronics is gobbling up equipment at a rising rate. Industrial buyers used $.75 billion worth of electronic equipment in 1955. This year the figure should hit $1.5 billion.

Fourth category: Replacement parts. This is another solid gainer. From $.75 billion in 1955, it will hit $1 billion in 1959.

Just Beginning—At the National Electronics Conference, Chicago, there were indications that, even with these records, U. S. electronics, like its rockets, is just getting off the ground. Ramo-Wooldridge announced that it is equipped to design and build computers automatically. Automatic manufacture of even radio circuits was still in its infancy as late as 1954.

Vacuum tube manufacturers are fighting the transistor with sufficient success and tube sales are swinging up. Only a year ago, it was freely predicted that the vacuum tube would be almost extinct by 1965. To clinch the climb, CBS announced a new 20,000 sq. ft. tube plant in Connecticut. A hint to metalworkers on the potentialities of the electronic market: The new plant employs a custom built 3000 lb. vacuum firing furnace. W. W. Watts, Radio Corp. of America, sees $930 million in electron tube sales next year; $1 billion in 1965.

Growth Continues — Electronics is still growing, grinding out new products at an increasing rate. A heavy portion of the nation's annual $10 billion research budget, is in electronics. General Instrument Corp. is hanging its hat on the infant thermoelectric device market—sees it as worth $100 million per year in five years.

Computers are another galloping area in the electronics race. One firm, planning to do job computing work for industrial and commercial firms, is planning five computer centers across the U. S.

Metalworking Market — What does it mean to metalworkers? The electronics industry is a live and growing market for machine tools, presses, steel, nonferrous metals, wiring, handling equipment, heat treat and specialized furnaces, and even entire production lines.

It can't all be good. Dark cloud on the market horizon is the swift growth of foreign electronic equipment in the U. S. market. Japan, United Kingdom, Italy, and Germany, are hard after U. S. customers, and U. S. distributors who'll distribute foreign equipment under their U. S. brand names.

NO SUCCESS: President's fact-finding board couldn't bring about an agreement. Board members, left to right, are John A. Perkins, George W. Taylor, chairman, and Paul N. Lehoczky.

Offers Fail, Injunction Asked

Standoff is complete as companies and union reject final compromise offers. T-H injunction asked.

It will go down as one of the most bitter negotiations in labor history.—By Tom Campbell.

▪ The American steel tragedy entered its pathetic phase this week. No one who has followed this six months of verbal misunderstanding between management and labor has ever seen, and may never again see, such a standoff.

When George W. Taylor, chairman of the government's board of inquiry under the Taft-Hartley law, entered the case, he was optimistic. At the end of the hearings and the night before the report was presented, he was a saddened man. And for two reasons: He had expected to use his office to "get a settlement." He was sure this case was like others.

(Late Monday, President Eisenhower asked the Dept. of Justice to petition for an injunction to send the steelworkers back on the job. This is the start of the 80-day injunction machinery, but the union will fight through the courts.)

Was Predicted—Mr. Taylor was wrong on both counts. Joseph F. Finnegan, director of the Federal Mediation and Conciliation Service, could have predicted such an outcome. And, finally, Mr. Taylor summed up what a few others have known for months.

"The board cannot point to any single issue of any consequence whatsoever upon which the parties are in agreement," he admitted.

Thus, in the half-inch thick report replete with figures and descriptions of disagreements, has been written the battle lines of what will remain for some time the industrial relations battle of this century.

Some Compromises—The board's report is a recapitulation of devastating disagreements. What many times seemed to be agreements were only mirages. What many times appeared to be an understanding of the points by both sides proved to be meaningless. And both sides have repeatedly said "the other side" has not and will not budge.

Yet in the past two weeks both sides have budged from their previous dug-in positions. But neither budged enough—in the opinion of the other—to see any daylight at all.

Time after time at the final public hearings in Washington, the board members were confused by different interpretations of the same points. It was apparent that neither side had any confidence in the other's ability to appraise properly

each other's package costs.

On the question of local practices, the union finally got off its high horse and suggested a special study body which would go into all phases of the famous section 2-B language and the distribution of productivity gains—if any. The companies refused to consider seriously this offer.

Companies' Last Offer — The companies, in a dramatic gesture at the last moment, offered to arbitrate this question: "What, if any, changes should be made in the local working conditions provisions to enable the companies to take reasonable steps to improve efficiency and eliminate waste with due regard for the welfare of the employees?" The union promptly blasted this as a "Cooperism" and a heads-we-win-tails-you-lose offer.

Outside of the inquiry board's report are many items which must be considered in this now well-established holy war by both sides to get what each wants and not to accept what it does not want. Here are the highlights of these factors:

Personality differences between Messrs. Cooper and McDonald. It seems unlikely that these two men will ever reach an agreement until current bitterness eases.

Complete ditching of all previous methods of approach by the companies to the union, as summed up in the indication that past bargaining has not been the right type for the steel industry.

A deepening distrust by union members of the negotiating team toward Mr. Cooper and some of the company representatives and vice versa.

What Now?—The last offer of the companies, which they say is worth 33 cents in three years, and which the union says is worth 24 cents, is the last one, unless a miracle shows up.

The union offer, which it says was 20 cents in two years and the company says was 32 cents, may be the union's last offer. Having gone to the extent of giving some on all points, both sides now feel they have discharged their duties.

P. O. Automation Opens New Market

▪ The largest, most efficient letter sorter in the world is being tested in Detroit. It is an electronic machine 78 ft long and 9.5 ft high. It normally handles 36,000 to 43,000 letters an hour. But it can top 54,000 letters an hour if necessary.

The sorter, and others like it, will help the U. S. Post Office Dept. reach its goal of one-day delivery between any points in the U. S.

Others Work on It — Built by Burroughs Corp. in Detroit, the first model is under test with regular mail in the city's Roosevelt Park Annex post office. It is one of 10 to be built by Burroughs under a $1.9 million contract.

Burroughs has the only contract at present, but Pitney-Bowes of Stamford, Conn., and several smaller manufacturers are also working on mail sorting machines.

P. O. Plans More—The Post Office says 28 sorting machines will be installed in Detroit's new $23 million post office. The building is under construction and will be open late in 1960.

By the end of 1960, every major U. S. city is expected to be using electronic sorters and other machines for letters and parcel post.

Handling Reduced — The machine cuts the number of mail handling operations to 3 from 12. Postal clerks sit at consoles next to the machine. Small vacuum arms place one letter at a time in front of the operator.

Clerks check addresses and punch piano-like keys which direct letter to one of 270 destination slots.

AUTOMATIC MAILMAN: This machine locates and cancels adhesive stamps on letters at the rate of 500 per hour. It is a joint development of Pitney-Bowes, Inc., and a Dutch firm, Werkspoor N. V.

Power Source for the Future?

A-C Shows-Off First Vehicle Powered by Fuel Cells

Allis-Chalmers demonstrates fuel cells are a practical source of power for vehicles.

Advantages include greater efficiency and virtually unlimited life for power source.—By K. W. Bennett.

■ A year ago a research man at Allis-Chalmers Manufacturing Co. flipped a switch. Two light bulbs flickered, then burned brightly. The electric current came from a "new" power source—a "fuel cell." The cell burned propane to generate electricity.

Last week, the fuel cell moved from the laboratory curiosity class. An Allis-Chalmers D-12 farm tractor hauled a two-bottom plow down a furrow to become the first fuel cell powered vehicle in the nation—and probably the world.

1008 Fuel Cells—A-C's vehicle employs a conventional D-12 gasoline engine tractor chassis. The gasoline engine is replaced by 1008 fuel cells. The cells are simply 12 in. x 12 in. metal and mesh plates. They are clamped together in 17 lb bundles—112 of them.

The metallic parts are unaffected in the production of electric current. The breakdown of propane and oxygen supplies the electron stream.

Plenty of Pull—The test tractor generates 3000 lb of drawbar pull. Current generated by the cells is fed to a conventional 20 hp DC electric motor. The vehicle moves at speeds up to 10 mph.

Fuel Cells Power A-C Farm Tractor

CURRENT EVENTS: A mixture of fuel gases—mostly propane—and oxygen react in an electrolyte within 1008 fuel cells to provide the electricity that powers this experimental Allis-Chalmers tractor.

Dr. H. K. Ihrig, in charge of Allis-Chalmers research, points out two important advantages for the fuel cell.

Higher Efficiency—The best internal combustion engines are rated about 40 pct efficient. The test tractor power plant is 60 pct efficient. And the figure will be boosted to 80 pct before commercial production of fuel cell "engines" is part of the automotive scene.

In tests on one of the company's experimental farms the fuel-cell tractor plowed for 17 minutes using 2 lb of propane. In terms of fuel quantities, 2 lb of propane is about equal to ⅓ gal of gasoline.

Lasts Indefinitely — Because of the higher efficiency of the fuel cell engine, the gasoline powered tractor would not have been able to plow for as long a period.

The 1008 cells generate about 15 kw of current. They will operate without physical deterioration almost indefinitely. Electricity is produced only when the vehicle is burning propane.

Rear Motor Drive — Oxygen burned with the propane can be taken directly from the atmosphere, or a low purity commercial oxygen can be carried in a tank on the tractor. Total tractor weight is 5270 lb.

In a commercial vehicle it is possible that the single 20 hp DC motor will be replaced with two "pancake" DC motors. One would be mounted on the inside of each rear wheel of the vehicle.

First in Lift-Trucks—Allis-Chalmers officials point out that the fuel cell isn't a new idea. Electric current devices of this type can be traced as far back as 1839. But the A-C tractor is the first vehicle that can generate this much power using fuel cells as a power source.

High Court Will Consider Tax Case

Some of the tax depreciation questions bothering businessmen may be answered by the U. S. Supreme Court in its present term.

The high court has before it conflicting appeals-court rulings in cases involving depreciation deductions on motor vehicles. In two of the cases, the courts held for the government. In the third, the taxpaying firm got the decision.

Controversy Cause—Differing interpretations of the 1954 federal tax code led to a controversy between truck and car rental firms and government tax men. That code permits businessmen to take a fast tax write-off on the equipment they buy. But only items with a useful life of at least three years qualify.

Vehicle rental companies have maintained cars and trucks they buy have a complete life of more than three years. But they may sell some vehicles in less than three years.

The government insists rapid depreciation should apply only to the years in which the taxpayer holds and uses the taxed item.

BDSA Sets Rules For Defense Steel

Business and Defense Services Administration of the Commerce Dept. issued special rules under the Defense Production Act to reduce disruption to military and atomic energy programs resulting from the steel strike.

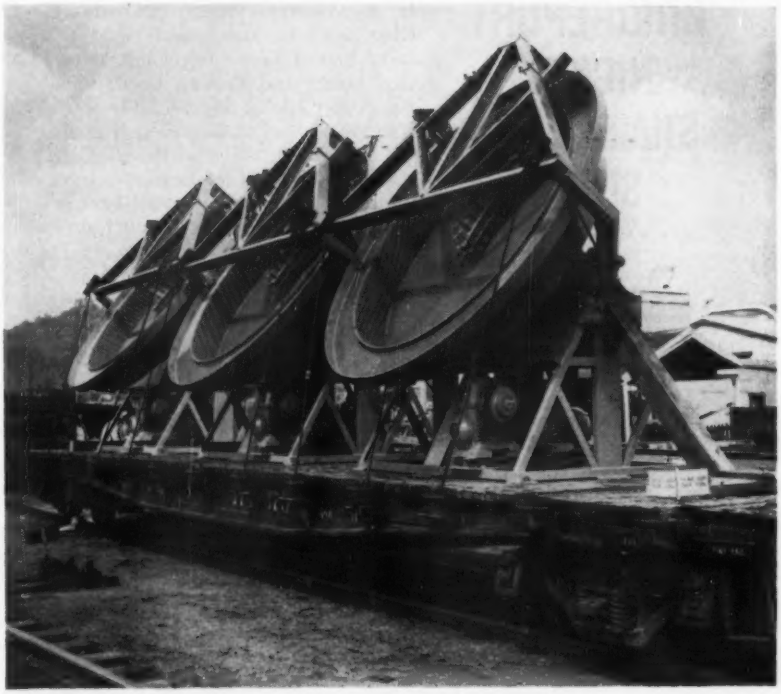
Administrator H. B. McCoy emphasized that the special rules were applicable to both struck and nonstruck steel mills. They will not be applicable to the former until resumption of operations.

Working mills, accounting for about 15 pct of steel production capacity, were directed to give immediate top priority to urgent programs as missiles and launching sites, and nuclear-powered naval vessels. This move provides only a partial solution to defense steel procurement problems since the nonstruck mills do not produce many of the required mill items.

When the Mills Open — The struck mills were directed, upon resumption of operations, to accord top priority to these urgent programs. In addition, the special rules (direction 1 to BDSA order M-1A) establish procedures under which the struck mills may more quickly achieve maximum production of steel products for both civilian and military use. At the same time they assure prompt shipment of steel products against orders of the Defense Dept., Atomic Energy Commission and their contractors and subcontractors.

This will be accomplished by permitting mills currently shut, which have a backlog of defense orders, to schedule production and shipments to fill these orders in any sequence, provided all such orders are filled by the end of the month following the month of resumption or 45 days after resumption.

On the Way From Dravo to St. Joe



MIX WELL: These antenna-looking devices were made by Dravo Corp., Pittsburgh, for St. Joseph Lead Co., Monaca, Pa. The discs will prepare a mixture of roasted zinc concentrates, fines, flue dust and coke breeze for agglomeration on St. Joe's sinter machines.

Alan Wood Plate Plans

Alan Wood Steel Co., Conshohocken, Pa., will build a combination blooming mill and plate mill as the first step of its $25 million expansion program.

The new facilities will be the prime factor in the company's plans to double its plate production.

Auditors Barred

Auditors for Congress continue to be barred from examining records of U. S. military-aid contracts for purchases abroad.

A new order by President Eisenhower waives one provision of law which otherwise would apply to Mutual Security Act contracts. The waived language excuses General Accounting Office examination of some contractors' records.

BRIDGEPORT NICKEL SILVER SHINES AT THE SYMPHONY

H. N. White Company, Cleveland, Ohio, imparts "instrumental beauty" to its line of King saxophones, flutes, trombones and French horns with Bridgeport Nickel Silver (Alloy 565). This alloy comes to them in strip form, Class B Finish, Soft and Ductile, and is skillfully formed. Material requisites for this operation are consistent in specification and color. White instruments must be beautiful as well as functional for long and flawless service.

This *standard* Bridgeport alloy adds strength and beauty to many products. Its silver color and exceptional ductility lend themselves to the highest quality hollow ware and tableware for severe use (as in hotel and home service); to zippers, costume jewelry, etching, name plates, camera parts, optical goods and electrical applications.

Nickel Silver is only one of the many standard Bridgeport alloys. You may not be in the business of manufacturing musical instruments; however, your product may need a copper base alloy with the uniformity that H. N. White Company gets from Bridgeport's Nickel Silver. To find out how we can help you, call us or write Dept. 3410.

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY

Bridgeport 2, Conn. • Sales Offices in Principal Cities

Specialists in Metals from Aluminum to Zirconium

Allan Ray Putnam

ASM President Plans Ahead

As president of the American Society for Metals, Allan Ray Putnam is working to further the diversified work of the organization.

Under his direction, educational and technological program will be expanded.

▪ As futuristic in his thinking as the American Society for Metals new building is Allan Ray Putnam, new managing director of the 30,000 member organization.

Although just getting into his new job, Mr. Putnam is rapidly absorbing the wealth of information from a top notch staff assembled by the late founder and long time managing director, Wm. H. Eisenman.

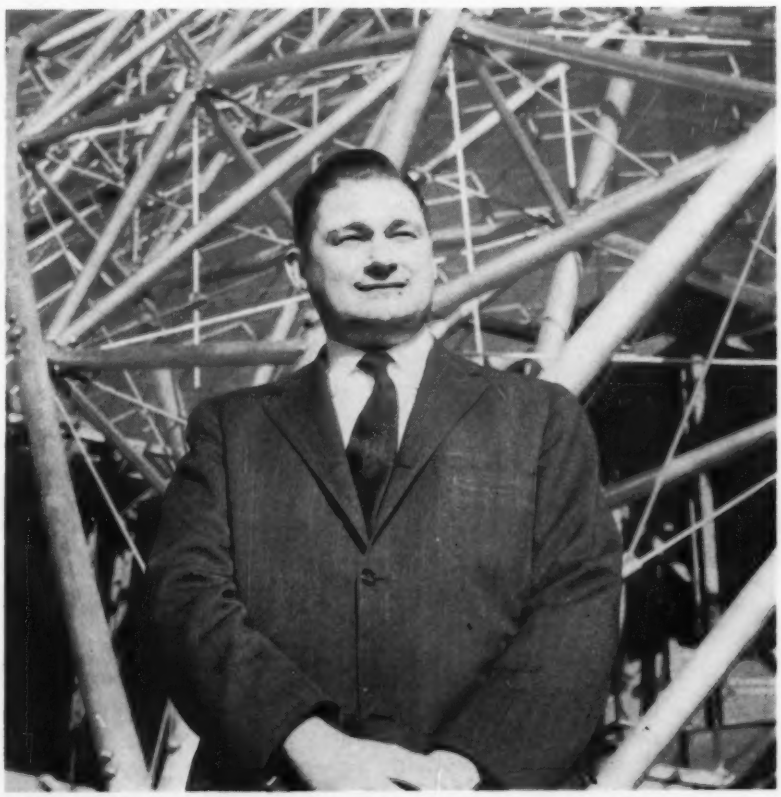
Typical of programs for the future is an electronic brain for mechanical searching of technical literature. This will go through 100,000 abstracts an hour for information on technical subjects for industry and research.

An indication of how the sheer bulk of technology in metals has gone up is the famed 1800 page Metals Handbook written in 1948 and known for its telephone book size. It is now being re-written into 5 new sections, each will be as big as the original book.

Looking Ahead—With an eye to the future, under Mr. Putnam's direction educational programs for youth will be expanded. The ASM's Foundation for Education and Research carries on the work with scholarships, fellowships and other activities.

ASM's Future Scientist of America contest had 4700 entries from 7th to 12th graders last year.

"We are extremely interested in building for the future with this program," says Mr. Putnam. "We are interested in getting youngsters into engineering generally and are finding a big demand for our educational literature."



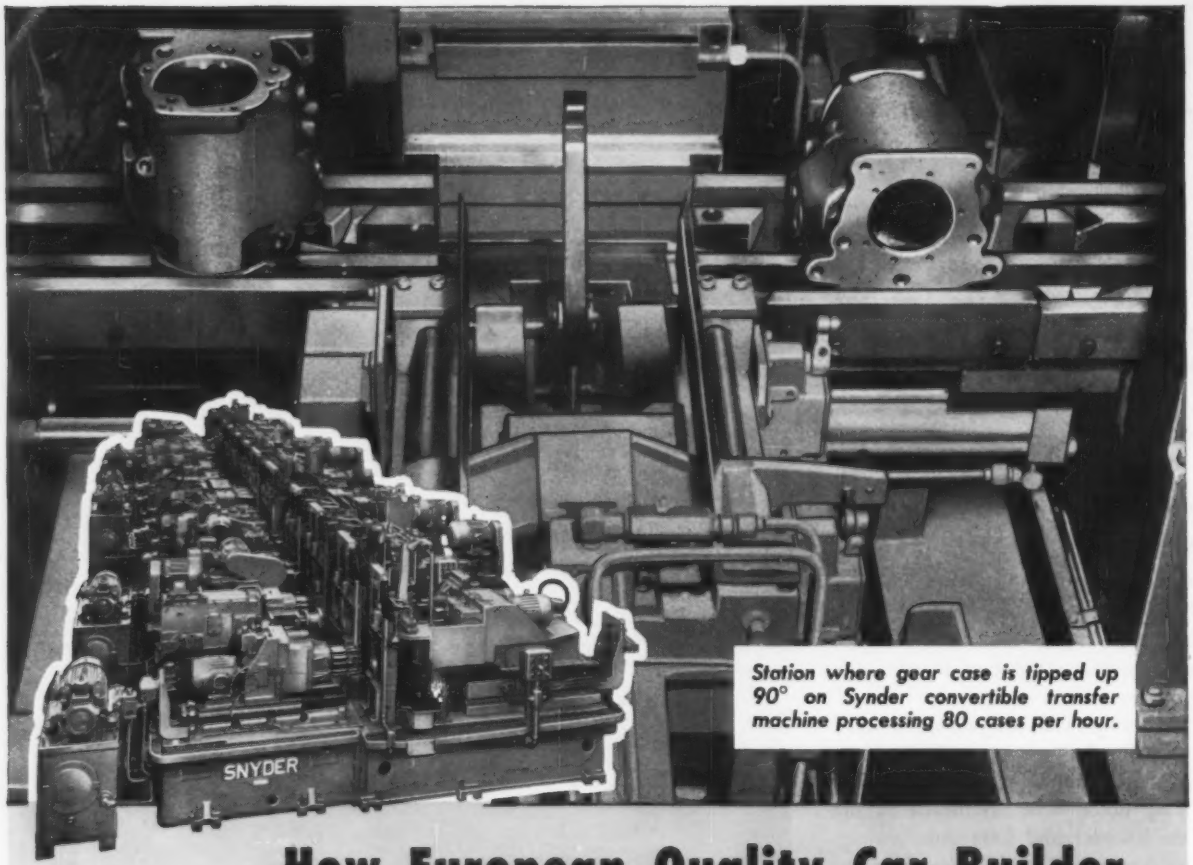
ALLAN RAY PUTNAM: "We are interested in building for the future."

Correspondence Courses—"In a similar vein our home study program is going over well with over 2000 enrolled from 36 countries and 1000 certificates already awarded. Individual ASM chapters are also pushing in-plant training with backing from headquarters here."

The Metals Shows, too, will continue to be a major activity. This year's show in Chicago will have about 500 papers. Regional shows in the South and West are also a growing attraction.

In defense work ASM is also doing its part with two major projects on castings methods and machineability of all metals.

Pennsylvania Alumnus — Only 38-years-old, Mr. Putnam has already made his mark in the engineering society world. Following graduation in 1942 from the University of Pennsylvania's Wharton School of Business and Finance, he served with the Army Air Corps, coming out a captain. He was business manager of the American Electroplaters Society until 1949 when he joined the American Society of Tool Engineers in Detroit where he has been assistant executive secretary under Harry Conrad.



Station where gear case is tipped up 90° on Synder convertible transfer machine processing 80 cases per hour.

How European Quality Car Builder Snyderizes for the Soaring Sixties

This new 53-station transfer machine combines special purpose efficiency with high convertibility for later changes. Part orienting devices enable Snyder to utilize standard horizontal way-type units to drill, spotface, chamfer, ream, line-ream, mill and bore this cast iron standard gear transmission case on all faces. The cases are turned 90° at the thirteenth station and tipped up 90° at the thirty-eighth station, which eliminates vertical machining units. The part is specifically located on faces not subject to future design changes, thus reducing future capital expenditure.

* * *

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How to Plan for New Products

Management is spending more time concentrating on new product planning.

There's a growing trend to coordinate planning at the general management level. Use of committees also increases.

▪ Who should direct new product planning? What's the best method of coordinating plans?

Management is directing more attention toward product planning and making more efforts to direct it. There is a growing trend toward coordinating product plans at the general management level.

Who's in Charge—This thinking showed up in a recent survey made by the American Management Assn's Marketing Div. Almost half those polled believe new product plans requires management coordination. Nearly two-thirds feel best results are obtained when product planners report to general management—the president, general manager, or executive vice president.

Often, product planning committees are set up to develop new products. Where a committee is used, some member of general management is usually chairman. In some cases a marketing executive fills the chair. In other cases a research and development executive serves as chairman.

Sources for Ideas—What are the best sources for new product ideas? Those that come from the sales area (talks with salesmen, sales reports) are listed as the most valuable. Next come suggestions from research and engineering staffs. Third most helpful source is in customer suggestions, inquiries, and complaints.

Some other sources include: Market research, analysis of competitors' successes and failures, government agencies, and employee suggestions.

Planning Trends — What directions will industrial product planning take in the future? Industrial companies are most concerned about getting products to fill out their lines. They are also looking for products which will give better performance. Also wanted: Product features giving uniqueness or identity, and products using new materials.

Tailored Products—Another trend in industrial product planning: More specially-tailored products. Designed to penetrate specific markets, this trend shows up in "system" or package products, miniaturization, and highly automated units.

What Does a Manager Need?

▪ Management meets other challenges than the creation of new products. In the swiftly changing economy, new consumer needs, new services, new trade areas present other challenges.

Together, they make the job of business management exciting as well as rewarding. But successful managers must bring some enthusiasm to the position.

Understand and Work—This is the conviction of William C. Newberg executive vice president of Chrysler Corp. He maintains, business "needs large numbers of young people who will catch fire with the excitement and challenge of management. . . . who will understand its meaning for their personal development, its importance to our country and our civilization.

"There is no shortage at all of people who would like to succeed as managers," Mr. Newberg says. "But there is a shortage of people who have the desire as well as the ability to learn. There is a shortage of those who want to succeed, are willing to work and work hard, have the imagination to understand the true meaning of the manager's job and the heart to put into such a job."

Traits Wanted—What qualities is business looking for in management personnel? These are the traits Mr. Newberg singles out: ". . . Young men with individuality, with courage, with imagination. Industry is looking for men who know how to contribute to an organization."

Home Construction Will Dip in 1960

Next year home building will dip below the all-time high now being set this year. But, despite this, construction in 1960 seems headed for another good year.

Economic forecasters for Johns-Manville Corp., predict a possible 9 pct decline in home starts during 1960. Principal reason: Gradually tightening money conditions in the building field will carry over into next year.

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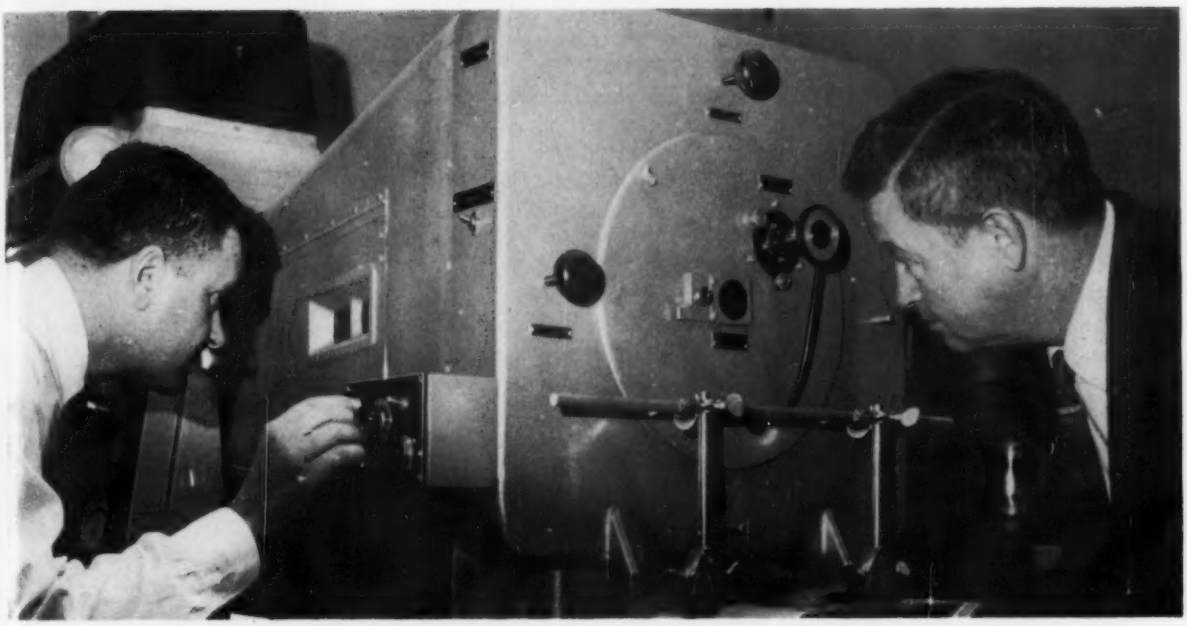


HIGH-TEMPERATURE STUDIES: Future uses of metals depend on high temperature properties. Dr. I. C. Schoonover (right), National Bureau of Standards, notes reaction of ultra-pure substances at 6300°F.

An Explosive Period For Metals

How will recent technological developments affect the role of metals in the coming years?

Representatives of ferrous and non-ferrous industries give their answers.—By C. L. Kobrin.

▪ Many technological advances have been made in metalworking materials and processes in the past ten years. But they're only a beginning. The pace will be even greater from now on.

What will this technological "explosion" mean to present materials, processes and markets in the coming years? The IRON AGE posed this question to key people in certain metal industries. Here are their answers.

Aluminum Tonnage Up—Frank L. Magee, president, Aluminum Co. of America, states: "By 1987, even the most conservative prophet would place domestic consumption of aluminum at 10 million tons, more than a fivefold increase over present usage. The growing needs of the nation's exploding population will demand greater uses of aluminum in mass transportation. . . .

"New aluminum alloys will be commonplace in space vehicles, and giant aluminum reflectors will be gathering solar energy for use in home and industry. Aluminum homes that never need maintenance will be everywhere."

F. J. Close, vice president, Aluminum Co. of America, adds: "Man's scientific knowledge has reached the point where it's coming very close to equaling his imagination. We now know how to build an aluminum sandwich panel 1½ in. thick where it has insulating value equivalent to 26 in. in brick."

Lower Beryllium Costs — From the Beryllium Corp.: "On the basis of increased usage over the past two years, we believe that the usage of beryllium in the aircraft, missile, and nuclear fields will increase by a factor of ten in the next five years.

"We have already estimated that by doubling the industrial production of beryllium billet, prices on billet could be reduced from present levels by 15-20 pct. However, the most substantial price reductions can be made by improvements in fabrication techniques.

"At the present time, the average per pound cost of beryllium metal fabricated shapes is in the $100-$200 range, depending upon complexity. Significant advances in being able to utilize scrap, and in the reduction of the ratio of starting material to the weight of the fin-

ished part will significantly reduce costs."

Mine More Copper—Spokesmen for the Anaconda Co. point out that copper is man's first metal; its excellent properties are well known. It ranks at the top as a thermal and electrical conductor. Copper is easy to fabricate and to join. It is attractive, corrosion resistant, and easy to alloy.

But the future of copper is tied up in the availability of the metal. Shortages developed by wars and other emergencies have been responsible for loss of markets. Anaconda's El Salvador mine, which has started producing in Chile, will help solve this problem. And the Toquepalla project in Peru is due to start next year.

Lead and Zinc to Gain—Forecasts, made a few years ago on availability of lead and zinc, are obsolete. New reserves indicate no lasting shortages of either metal during the next 20 years.

Simon D. Strauss, vice president, American Smelting & Refining Co., points out that techniques for the extraction of lead and zinc from their ores are improving. No radical innovations are expected. But steady progress in increased recovery at lower expenditures of manpower and fuel is indicated.

World lead and zinc producers have embarked on a vigorous research and development campaign. Current interest includes the use of lead in sound attenuation and vibration control. Lead shielding in nuclear development will provide an expanding market. Lead is also finding new uses in the ceramic and enamel industries. Zinc's role in the field of cathodic protection is likely to be widened materially.

FABRICATES SHAPES: Plasma arc jet will increase use of refractory metals. Here, it sprays molten tungsten particles to form rocket part.

Pump Molten Magnesium—Magnesium will be in an excellent price position. The source is virtually inexhaustible. And as large volume markets open up, the price of magnesium will drop.

The Dow Chemical Co. also feels that future planning will take advantage of the fact that molten magnesium can be pumped in metal pipes. It will be possible to build plants at convenient locations such as coastal areas. Primary magnesium, produced and alloyed in these plants, could then be pumped to nearby diecasting plants for processing into finished parts.

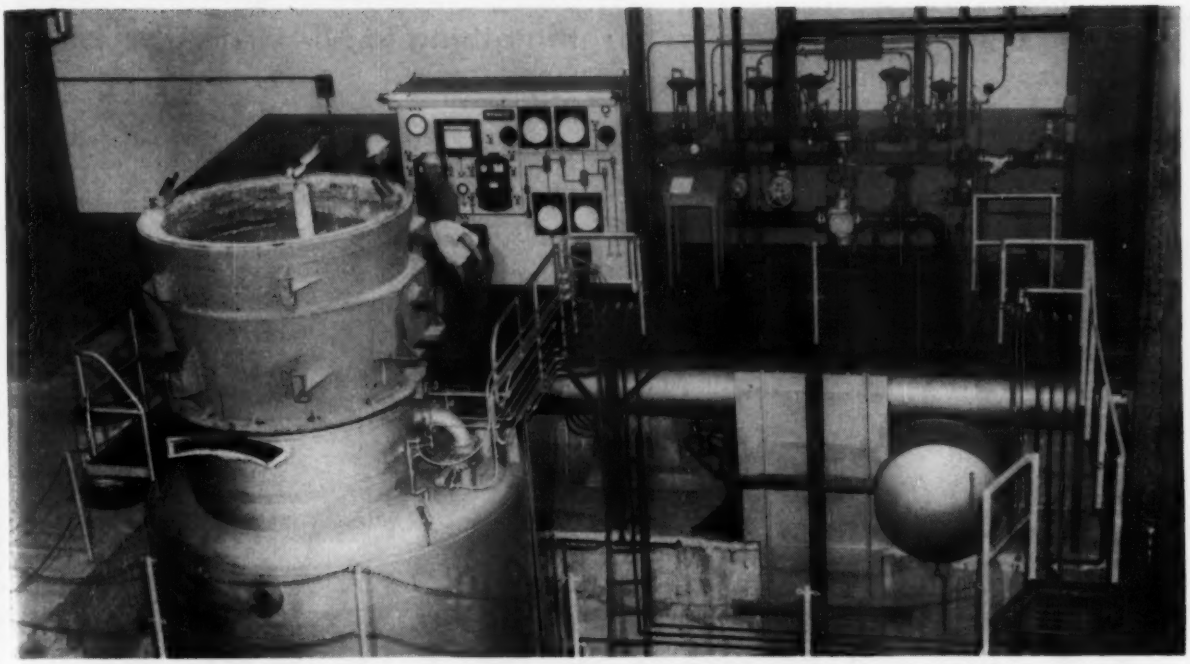
Other Dow conclusions: The automotive industry's recent trend to light weight will undoubtedly continue. The aircraft and missiles industries will also use more magnesium in various forms. Magnesium boxcars will appear. By this time, scores of items useful in our daily lives will be made of magnesium for reasons of both lightness and cost.

Nickel in Demand — K. H. J. Clarke, manager of Canadian sales and market development, The International Nickel Co. of Canada, Limited, has some interesting information on the future of nickel. He points out that, in coming years, nickel-base alloys will be in demand for a variety of applications.

These include: gas turbines for automobiles, truck tanks for transportation of milk and other liquids, heat-resistant components for high-speed aircraft and missiles; corrosion-resistant structures for nuclear energy sources; high-strength sections for highway bridges; vessels that can withstand low (—300°F) temperatures.

Refractory Metals Gain — Increased use of the refractory metals —columbium, molybdenum, tantalum, tungsten—in the coming years is promised from the very property that classifies them as refractory metals—their high melting points.

All four of these metals, and alloys of which one or another is the chief constituent, are receiving a great amount of attention as high



DEGAS STEEL: Installations such as vacuum stream degassing will provide high quality steels.

temperatures components in rockets, missiles, and advanced aircraft.

Harry W. Highriter, director of metallurgical development, Fansteel Metallurgical Corp., says: "So much research is being done on so many fronts, that more than one solution is certain to be achieved. When the successful material is found for rocket components, it will find numerous uses in other high-temperature applications.

"The present general method of extraction and purification, namely, chemical treatment of ores and reduction of pure intermediates to metal powers, will probably be continued. The availability of ores in the next thirty years, particularly columbium and molybdenum, is not expected to present any serious problems.

"Intensive work is going on, and will continue at an accelerated pace, on the production of ingots, sheets, and shapes in larger sizes. Powder metal ingots made by sintering are the simplest to produce, and, at present, the most economical. Ingots cast by vacuum arc or electron bombardment melting will have certain advantages. It is probable that all methods will be developed further and put to use."

New Steel Markets—In regard to availability, Bethlehem Steel Co. states that "the steel industry can be expected to install capacity to support future demands." New markets for steel will include "bulk transportation of liquid gas, new mass transportation developments, cargo usage, structural components (curtain walls etc.), packaging of soft drinks and possibly milk etc."

According to Dr. Carl B. Post, vice president and technical director of the Carpenter Steel Co., "Closer evaluation of costs of fabrication and replacement will be responsible for the major developments to be expected in the next 10 years for specialty steel products.

"Tools and dies, corrosion-resistant structures, high-temperature components and most other specialty steel products will be more economically produced and better in 1970 than they are today.

"The improvements will not be because of any revolutionary change in alloy composition or steelmaking methods but because of continued improvement in quality and uniformity of mill products, combined with better design of the tools or parts, and heat treating techniques in metalworking plants."

Dr. Post points out that the use of stainless will continue to expand. Also, stainless steel will be purchased by most metalworking plants in cold-finished forms to more closer dimensional tolerances than are now specified.

Use More Titanium: From Titanium Metals Corp. of America: "With a modicum of luck and a great deal of perseverance, titanium in 1975 may have lived down its reputation as a high priced metal. With the same type luck and equal perseverance, titanium castings should be realities, sonic welding a routine method of fabrication, strip rolling of wide coils of titanium alloy sheet a mature science, and continuous production of sponge, perhaps electrolytically, fully realized."

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Steel Strike Chokes Automakers

GM Hardest Hit as Production Comes to a Halt

The steel strike has now caught up with automakers as plants start to close from coast to coast.

Pressure is so tight that the Steelworkers seek support from embattled GM. Conversion deals help.—By A. E. Fleming.

▪ The steel strike is slowly squeezing the life out of 1960 model automobile operations. General Motors' assembly pulse is especially weak. Production beats of other companies are starting to fade.

Effects of the steel deadlock will mar auto making schedules throughout the final quarter of the year. It could be spring before normal programming gets underway even if the strike is settled this month.

The Big Question—Biggest teaser torturing car producers now is not, "When will assembly lines stop?" Rather it is, "When will assembly lines resume once they do stop?"

Manufacturers aren't the only ones facing this dilemma. Dealers are fretting over the possibility of empty showrooms in late November. Workers are preparing to dig in for layoffs they don't want and didn't expect.

Thousands of GM employees around the country have already been idled by layoffs that began in late September.

McDonald's Plea — There are others who recognize the seriousness of the steel shortage in auto plants.

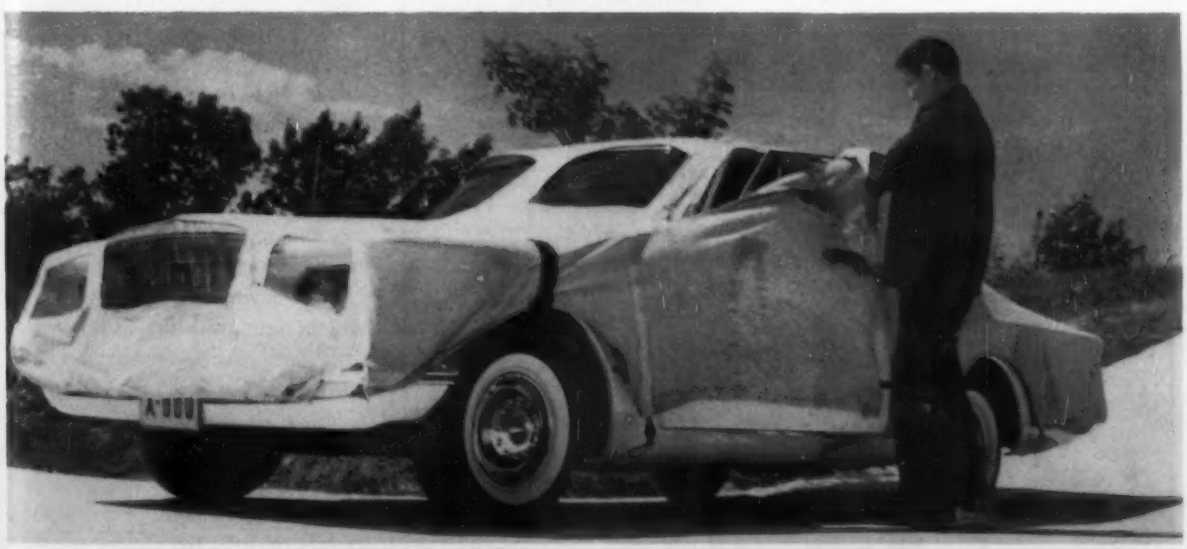
Last week at a semi-public gathering in Washington, D. C., David J. McDonald, USWA president, made a personal appeal for automotive support to help pressure the steel industry for a quick settlement.

He approached GM's F. G. Donner, chairman of the board, and L. C. Goad, executive vice president. Although GM made no official comment, the meeting had double significance:

Mr. McDonald would not have dared to make the appeal, which was publically acknowledged, unless he was well aware of the seriousness of GM's plight.

And the auto leaders, far from laughing off the idea, listened to Mr.

Will New Small Cars Lose Momentum?



WHERE IT HURTS: Automakers are most concerned about the impact of the steel shortage on the small cars, like Chrysler's Valiant, above, still to be introduced. They fear that they may lose their early momentum if production is cut off and potential sales are lost early in the model year.

McDonald's plea, then talked privately for some time.

The Situation—Ford Motor Co. can turn out autos until Nov. 15. But if it runs through that date without steel help, its manufacturing pipelines will be drained. It would take many weeks to restore normal operations. Still, Ford has followed overtime schedules in recent weeks and is spending $5-$10 million weekly on overtime.

Chrysler says it can carry through October and part way into November. Aiding Chrysler, however, is a deal with the Lone Star Steel Co. in Dallas. A contract calls for continued shipments of slab steel into January.

American Motors and Studebaker-Packard are in good shape. They can carry out normal production through the end of November.

GM Hurts Most—Chevrolet ended output of standard models Oct. 20. Corvair will wind up by Oct. 30; Pontiac's main plant in Michigan is expected to go down Oct. 28. Slowdowns have been felt since mid-October; Buick's Flint operation will begin layoffs Oct. 26. By Nov. 4, about 85-90 pct of the work force will be sent home; Oldsmobile begins sending them home this week (Oct. 19-23); Cadillac started layoffs Oct. 16. Assembly will halt around the end of October.

GM has been dickering for emergency steel contracts for over a month in order to delay plant closings. One deal with Phoenix Steel Corp. provided GM with conversion steel in the form of ingots and slabs.

After the Strike—How long the plants will be down is anybody's guess. Even if steel mills get going this month, it will be weeks before supplies of steel are adequate enough to warrant auto production. And automotive parts plants work four to six weeks ahead of assembly units.

A Detroit steel producer says it could be six weeks after the end of the steel strike before it could clear up its current automotive orders.

One estimate is that after production in Pontiac's plant halts Oct. 28, downtime after the strike's end would equal two days for every day the plant worked after Oct. 9. This means a shutdown of 26 work days at the minimum before production could get under way again.

Small Cars Hit—The Big Three have been funnelling as much steel as possible into their small car assembly plants. They want to keep dealers supplied with as many of these units as possible. They are reportedly selling like hot cakes.

Ford recently was forced to stop Falcon production temporarily because of steel stamping shortages. But the company did not blame the strike. It blamed it on a lag in its own steel stamping output.

The steelworkers union apparently banked on auto companies new model needs to force auto firms to pressure steel executives. But automen have not outwardly interfered, in spite of Mr. McDonald's visit (above) and their own situation. They are trying to hold tight on prices. If they were to push the steel industry too hard they'd have to be prepared to accept higher steel prices.

On Oct. 1 there were around 600,000 new cars in dealer hands. About 250,000 of them were 1960 models. About 350,000 were 1959 models. The depletion of 1959 models through October was not as great as had been hoped. The clean-up was slowed some by the strike.

Shortage Looms — There could well be a shortage of 1960 cars late this month. Pontiac and Chevrolet have sent letters to their dealerships saying their last shipments will be sent from the factories Oct. 30. The cars were introduced in early October. Buick, Olds and Cadillac dealerships expect similar messages before the middle of November.

And it will be harder for new car buyers to order the model and body style of their choice. It usually takes two or three weeks for a delivery of a preference model.

The Bull of the Woods

WILL YOU PLEASE GIVE THIS TO MY HUSBAND WHO IS ON LATHE TEN IN ROOM FOUR--AND THANKS A LOT!
IF YOU JITTERBUGS WOULD LEAD A NORMAL LIFE, THIS WORLD WOULD BE A BETTER PLACE FER TH' REST OF US TO LIVE IN-- I'M A WATCHMAN, NOT A BUTLER, MESSENGER AND VALET! NOW DON'T ASK ME TO COME OVER AND WASH TH' WEEK'S DISHES!
ONE MAN AIN'T ENOUGH FER THESE MODERN GALS--THEY NEED FIVE ER SIX!
YEH, WE'D BETTER GIT OUTA HERE-- SHE'S GOT A FLAT TIRE OUT THERE-- LET HER GIT A COUPLE PASSERSBY!
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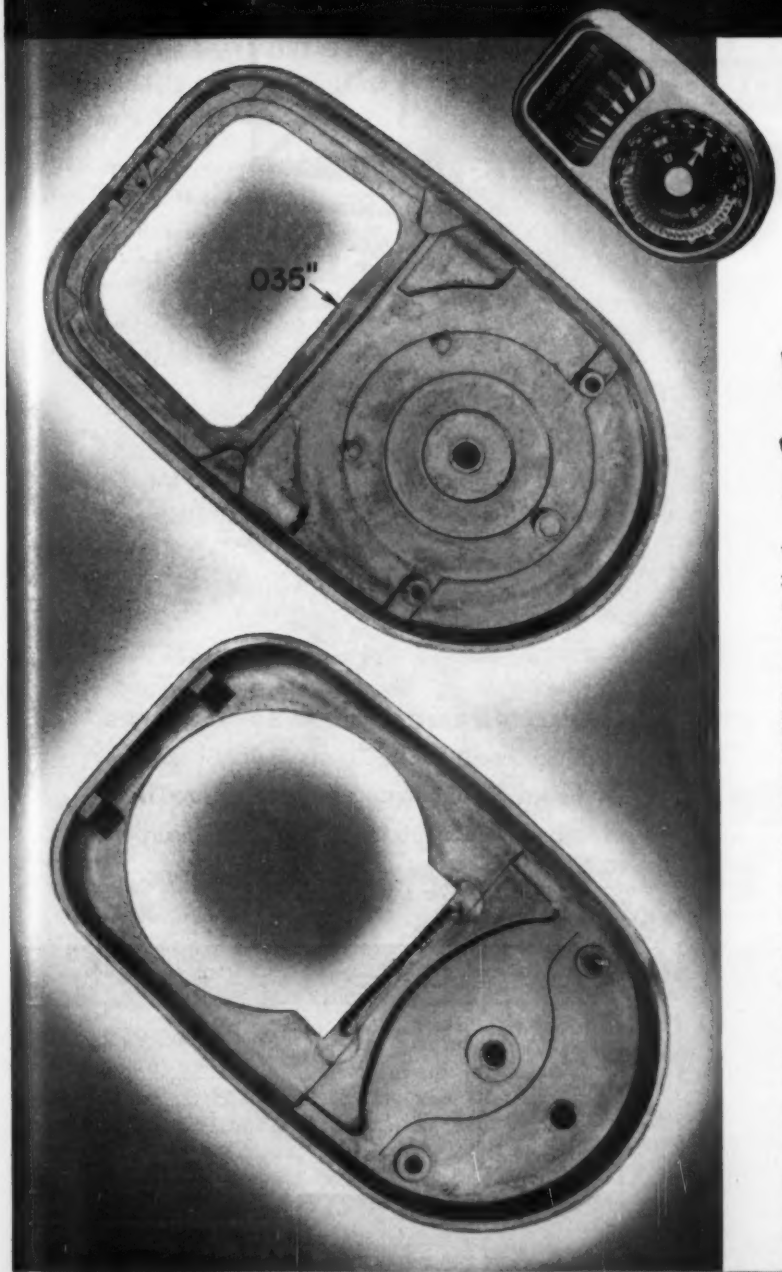

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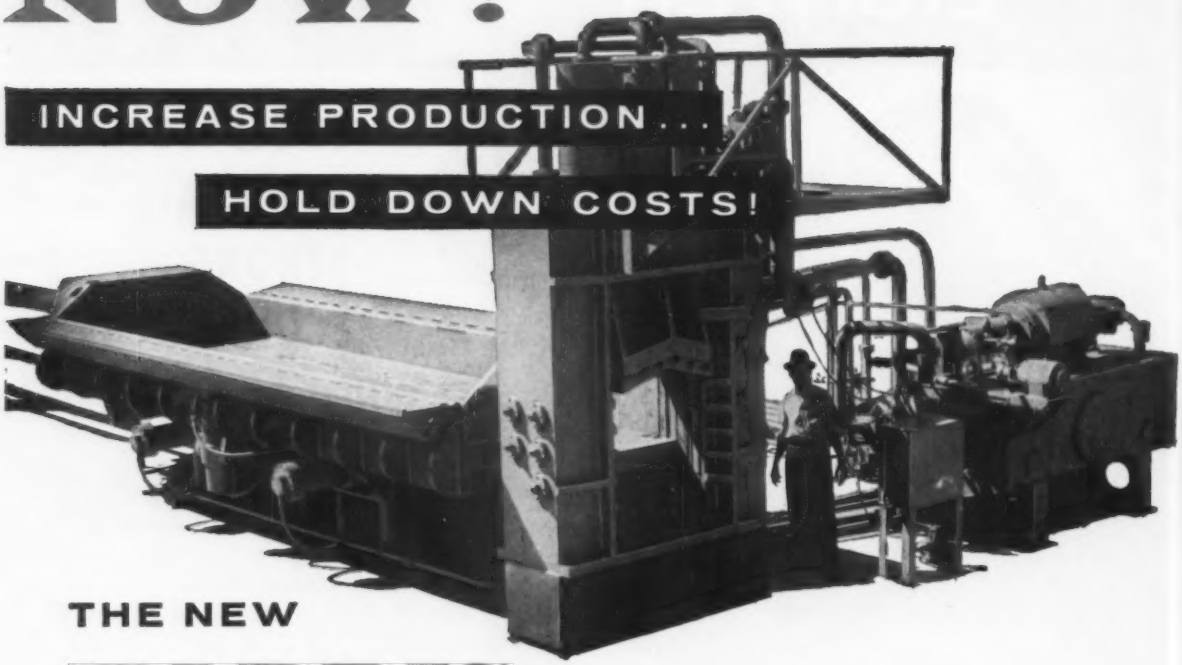

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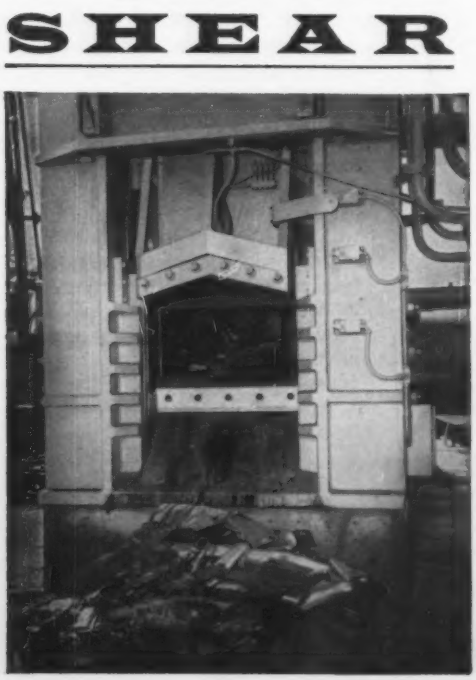

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Money Costs Slated to Climb

Although interest rates are at a record high, it's going to cost even more to borrow money.

Demand for credit is simply outstripping the available supply of money.—By G. H. Baker.

▪ Money is to become still costlier in the months ahead. Although interest rates are already at record levels, the government's key moneymen say the peak has not been reached. A further tightening of the money supply and of interest rates lies ahead.

Some experts predict unofficially that the interest rates on government bills and notes will hit 6 pct in the weeks ahead.

The Reasons—There are several factors contributing to the further stiffening of rates and money supply: Demand for loans continues strong and unabated; the U. S. Treasury is adding to the tightening-up by its money-raising problems; and the monetary restraints imposed by the Federal Reserve System are biting in.

In recent months, the demand for money has simply outrun the supply. Consumer spending, coupled with big government spending, has placed a severe strain on the available supply of money. Spending by "government" has increased at all levels—Federal, state, and local.

More Credit Buying—Despite the crippling effects of the steel strike, most of the nation's wage earners are optimistic. A large proportion of the U. S. population is cheerfully going about arranging new credit for purchase of homes, automobiles, and household goods.

When the cost of money finally becomes too dear, the steam in the boom will begin to fizzle. Interest rates are, after all, set by the law of supply and demand. When the cost of borrowing money becomes too high to draw customers, the interest rates will begin to soften.

High Court to Survey Union Shop Practices

The U. S. Supreme Court is going to take another look at union shops, this time from the question of the use unions make of compulsary dues payments by members.

The high court will look specifically at whether a worker can be forced to pay union dues under a union shop agreement when some of the money is used for purposes which they oppose.

Constitutional Rights — Six employees of the Southern Railway System started the case in Georgia by protesting that the union shop provided by a 1951 act of Congress forces them to pay dues, some of which are used to support political candidates which they oppose.

This, they claim, deprives them of their property without "due process of law" and restricts their Constitutional right to free speech.

Outcome of the case could have far-reaching effects on the union shop and right-to-work controversy. With the exception of the railway workers, covered by the Railway Labor Act, federal law leaves the question of the union shop up to the states. Some have outlawed it under right-to-work laws, but most states permit it.

Reds Push Consumer Buying

▪ Soviet consumers are due for a better break. It's a direct result of Premier Khrushchev's recent trip to the United States.

Up to now, the Soviet economy has given top priority to military goods and to avenues of scientific exploration. The supply of consumer goods has been extremely limited, and prices have been kept artificially high so as to discourage purchases.

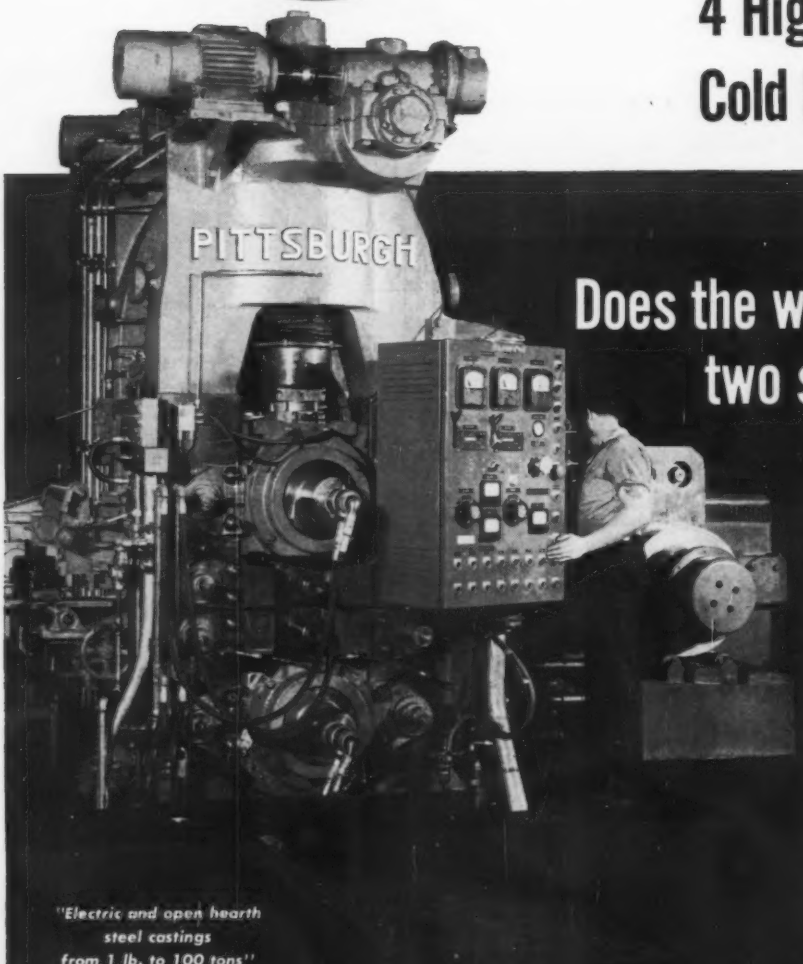
Russians Looking—All this is to be changed. Although the Kremlin has made no announcement of any shift in government policy, there have been several Soviet inquiries in the manufacturing areas of Western Europe concerning the availability of consumer products. NATO countries have been asked to establish credits totaling hundreds of millions of dollars in anticipation of Communist purchases.

Changes Coming — Another indication of the new concern being displayed for the Soviet buying public may be found in some recent speeches by Premier Khrushchev. The No. 1 Communist declared the time has come to produce more and better consumer goods. Quality must be improved and prices must come down, he stated. And he urged his people to improve their dress. Wear more colors, and avoid the traditional Russian grays and blacks, he urged.

There is no immediate prospect of Red purchases in the United States of automobiles or household appliances. But this new catering to the Russian masses is an important shift, and it is one well worth watching to see how far it will be allowed to continue.

PITTSBURGH

Combination 4 High/2 High Cold Mill . . .



Does the work of two separate mills

"Precision" and "Versatility" are the words that best describe the new combination 2 High/4 High Cold Mill designed and built by PITTSBURGH to secure precision gauge, temper and finish for the ferrous and non-ferrous industries. As a 4 High Mill, it is used for cold reducing; as a 2 High Mill, it is used to acquire the desired temper and finish. Several desirable design features are incorporated to keep roll change time to a minimum. Low initial cost and economical operation are attractive plus values.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

HEAVY MACHINING FACILITIES

Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

PITTSBURGH
ENGINEERING & MACHINE DIVISION
Pittsburgh Steel Foundry Company
TEXTRON, INC.

BOX R, GLASSPORT, PENNSYLVANIA · PLANTS AT GLASSPORT & McKEESPORT, PA.

What's Coming Next in Missiles?

Experts Take Close Look at Space Age Needs

During recent SAE meeting in the Farwest, aircraft engineers made some predictions about coming space craft.

They forecast smaller missiles, space ships driven by nuclear power, more simplified design. —By R. R. Kay.

▪ Future trends in missile and space ship design are getting close attention.

Aircraft engineers took a good look at some of the coming problems during last week's Society of Automotive Engineers Aeronautic Meeting in Los Angeles.

What to Expect — The experts agreed the industry has a nightmarish job ahead. Some of the conclusions reached were: Missiles will be getting smaller in the next few years. Reliability is a top missile need.

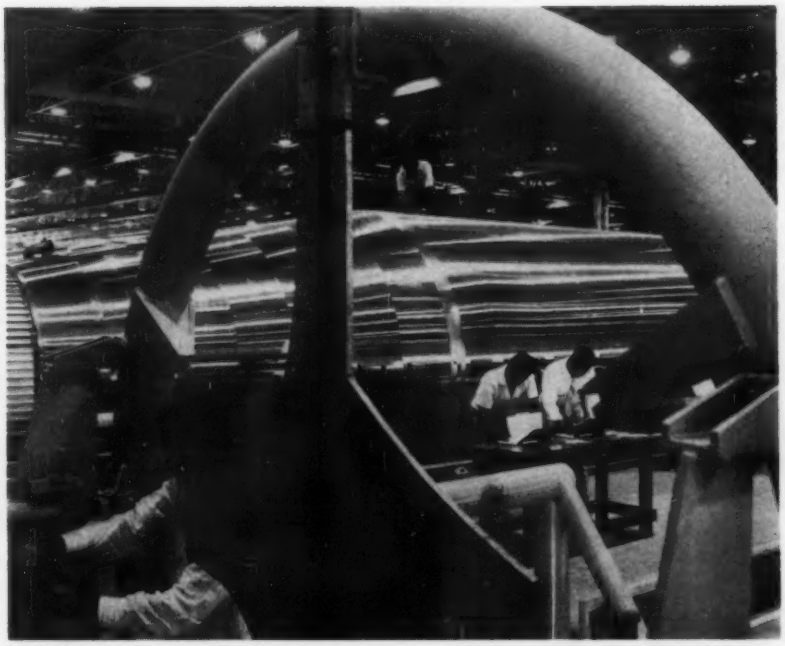
With over 50 pct of the nation's aircraft-missile industry located in the Farwest, interest there is at peak levels.

Here are some of the highlights of the SAE meeting:

Ten years from now space ships about the size of a DC-8 will make lunar trips at 25,000 mph. That's a prediction from R. L. Johnson, Douglas Aircraft's chief engineer for missiles and space systems. How will they do it? Nuclear power.

Some Larger, Some Smaller— Mr. Johnson says that current missiles are space ships of a sort, since they travel hundreds of miles above the atmosphere. Many of their materials and techniques will apply in the future.

"Ballistic missiles in the next few years will be getting smaller. Space ships dependent upon chemical fuels must get much larger than anything yet built," the Douglas engineer points out.



MISSILE BUILDING: Missile and space craft designers are looking beyond production line scenes such as this of the Atlas at Convair Div. of General Dynamics Corp. plant. Smaller-sized missiles are predicted for the future.

Nuclear Drive — Missiles will shrink in size with stronger and lighter materials, lighter guidance systems, smaller warheads, and better propulsion systems.

But space ships will be huge because of the large cargoes needed for expeditions. Only with nuclear power, Mr. Johnson says, can their size be held down.

Today's missiles are bringing us closer to the Space Age. But we need more reliable systems than we have today to get us there. That's the opinion of B. B. Richardson, design specialist, Norair Div. of Northrop Corp.

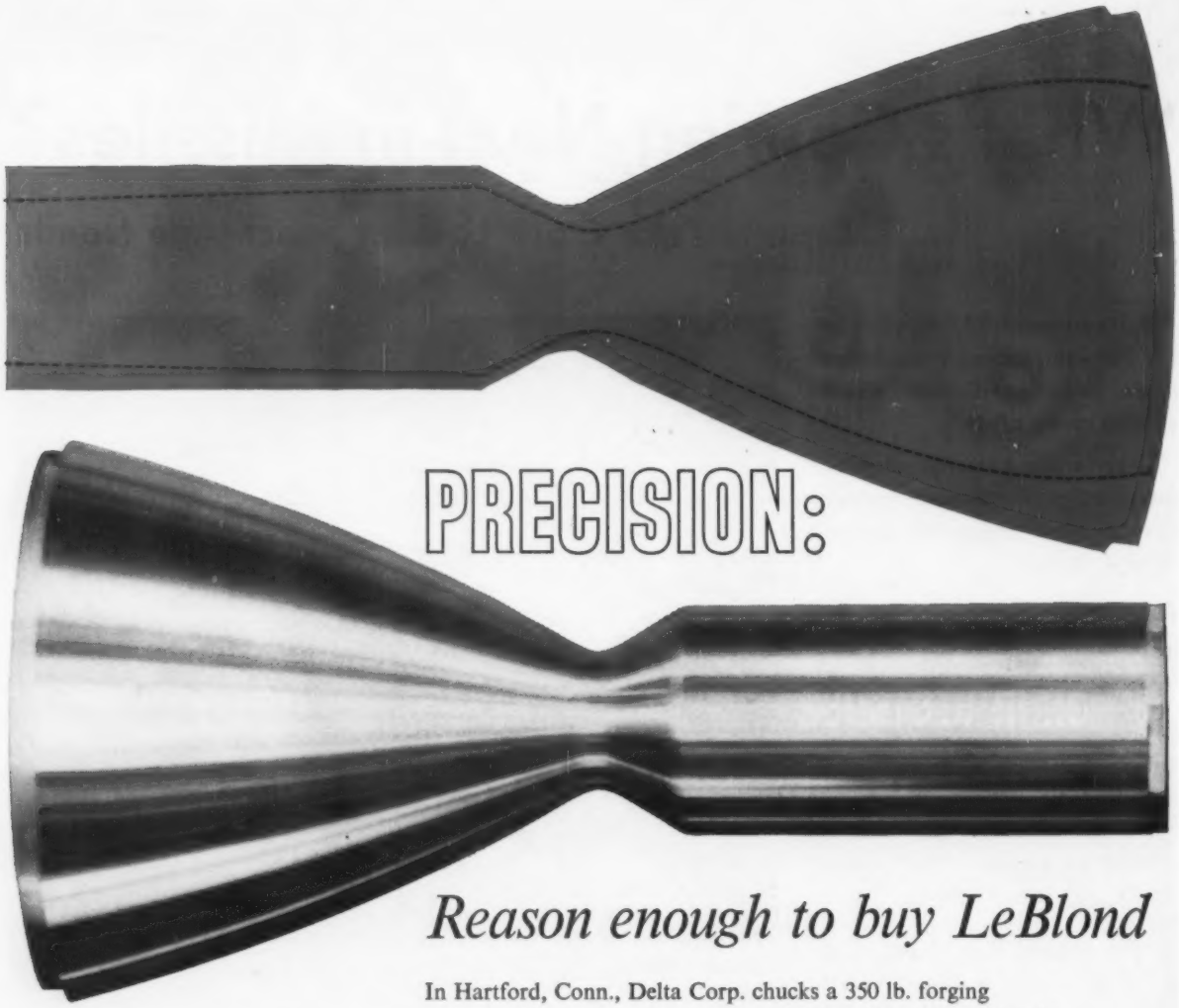
Plus Design Study — Simplified design is the greatest single factor in getting reliability. Mr. Richardson recommends following these guides:

Absolute mechanical simplicity.

No component that is not a must.

Design for liberal performance margins. Adequacy isn't enough.

Beryllium for Space? — Norair Div. of Northrop Corp. is extruding U-shaped beryllium parts 15 ft long and ⅛ in. thick. If all goes well, the company hopes to produce 20-ft channels of the same thickness. That's a good length for aircraft and space vehicle parts.

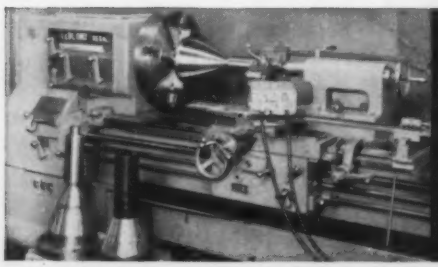


PRECISION:

Reason enough to buy LeBlond

In Hartford, Conn., Delta Corp. chucks a 350 lb. forging of 347 stainless in its tracer-equipped, 24″ LeBlond Regal Lathe. Delta is a specialist in precision sheet metal weldments and exacting machining jobs. When this job comes off the Regal it will be a contoured tube weighing only 18 lb. Its walls will vary in thickness from ⅛″ to 1/16″ according to a rigid and complex pattern. Wall thickness will be held to ±.003″; ID to —.001 +.000; OD to ±.008; and finish will be 20 to 30 rms. If the job is run 3 or 30 times, the same precise result will be achieved—reason enough to buy a LeBlond.

You never hesitate to put this kind of work on a LeBlond Lathe. You know that the sturdiness, the horsepower, the precision is there when you need it. It's what you'd expect from the world's largest builder of a complete line of lathes (and of tracers for lathes, too.)



THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND *of Cincinnati*

GE Follows Its Own Advice

Company Sets Up an Automation Consulting Service

Automation task force will help GE departments solve manufacturing problems.

It will also recommend where and how more automatic equipment can be used.—By R. H. Eshelman.

▪ Every machine tool survey points out large segments of obsolete equipment in American plants. It's apparent even to casual visitors: Soviet Premier Nikita Khrushchev offered a few side remarks on an obsolete lathe found in a Pittsburgh steel plant.

Production engineers and manufacturing executives are fully aware of the problem. Their machine replacement lists and improvement projects have a way of getting pigeonholed year after year.

New Yardsticks—A recent production meeting of SAE suggested new yardsticks for cost evaluation are needed in manufacturing. Engineers pointed to many automation installations the accountants said would never pay. But they did, and big.

Even the largest firms face such resistance to change. Just announced, but very quietly, is a new "internal automation operation," at General Electric. President Robert Paxton is an avowed proponent of program-controlled production and other manufacturing advances.

Consulting Service — But the swing to "progressive mechanization" and automation apparently is still too slow for Mr. Paxton. Here's a new and subtle pitch for modernization: Division and plant management of GE, virtually autonomous, will now have at their elbows, an internal "consulting service."

This consulting group will study automatic processing of both information and material, says John E. Ryan, who heads it. The group will help specific departments solve their manufacturing problems. It will examine the company's varied operations, recommend where and how greater advantage can be taken of growing opportunities for profitable automation.

Equal Footing—For some time GE has been advising both large and small companies to set up manufacturing development on a par with product development. "Neglect of product development shows up in immediate and catastrophic effects . . ." it's noted, "but effects of out-of-date manufacturing methods, processes and equipment—although just as dangerous in the long run—are more gradual and more difficult to identify."

Now, it's evident that if a firm wants to be a leader something more is needed. That's an automation task force. "Automation Planning," GE explains, ". . . requires pooling of specialized knowledge and skill in engineering, manufacturing, marketing and the other functions of business."

Experiment to Get More Production

HEAVY CUT: Carbide tools take heavy cuts on tough alloys in an experimental setup at Shear Speed Chemical Products Div., Michigan Tool Co. The aim is to get higher output with today's higher powered machines.

INDUSTRIAL BRIEFS

Castings From Haynes—Under a recently negotiated licensing agreement, Haynes Stellite Co., Div. of Union Carbide Corp., is now producing investment castings of Armco Steel Corp.'s 17-4PH stainless steel.

Underwater Work—A new Dept. of Undersea Technology has been formed at Avien, Inc. It will develop instrumentation and propulsion systems for undersea applications. An advanced study and research center at Farmingdale, Long Island, N. Y., will be established to serve as headquarters for the new department.

Walkways of Steel—Walkways in the atomic energy generating plant of Consolidated Edison Co., Indian Point, N. Y., are being constructed of welded steel grating. Over 40,000 lbs of metal grating have been sold by the Irving Subway Grating Co., Inc., Long Island City, for this application.

Merger Planned — Shareholders of The Indiana Steel Products Co., Valparaiso, Ind., and General Ceramics Corp., Keasbey, N. J., will vote on the merger of the two companies. If approved, the merged company would be known as Indiana General Corp., and merger would become effective about Nov. 16.

New Locations — On Oct. 1, PACSOL and CALINOY, the two West Coast Divisions of Illinois Tool Works, Chicago, moved into a new plant at 3155 El Segundo Blvd., Hawthorne, Calif.

Russian Steel Dictionary — The British Iron & Steel Federation has prepared a 110-page English-Russian, Russian-English pocket dictionary covering the main iron and steelmaking expressions, including continuous casting of steel. Copies can be obtained from the Information Office, BISF, Steel House, Tothill St., London, S.W.1.

Not for the Garden — Parker-Hannifin Corp. has established an industrial hose assembly fabricating plant in the Chicago area. It will be known as Parker Fittings & Hose Div., Chicago Plant, 500 S. Wolf Rd., Des Plaines, Ill.

All-Weather Helicopters — A lightweight, self-contained radar navigator and flight instrumentation system, permitting all-weather operation of aircraft and helicopters, is under development for the Army by Sperry Gyroscope Co.

Headed for the Capital—C. W. Hasek, Jr., an engineer for The Babcock & Wilcox Co., New York, has been named asst. director, Power Equipment Div., Business and Defense Services Administration, U. S. Dept. of Commerce.

Defense Business — Hydro-Aire Co., Div. of Crane Co., Burbank, Calif., will develop and produce fuel pumps for the Air Force B-50 Valkyrie Global Bomber. The company was named as a pump supplier along with the Tapco Group of Thompson-Ramo-Wooldridge, Inc., Cleveland.

Indiana Acquisition — Kawneer Co., Niles, Mich., has acquired the South Bend Screw Products, Inc., South Bend, Ind. The new subsidiary will manufacture precision machine components for various Kawneer products.

". . . Ed Bates, our scheduled speaker, couldn't make it—in his stead Mrs. Bates will sing some songs. . . ."

Copper Concentrator—Western-Knapp Engineering Co., San Francisco, has a contract to design and engineer a 15,000 ton per day copper flotation concentrator. It is for American Smelting & Refining Co.'s Mission Project near Tucson, Ariz. Cost of the project has been estimated at over $40 million.

Research Medal — Dr. A. B. Kinzel, vice president, research, Union Carbide Corp., will receive the Industrial Research Institute Medal for 1960. Presentation will take place next May at the annual meeting of the Industrial Research Institute.

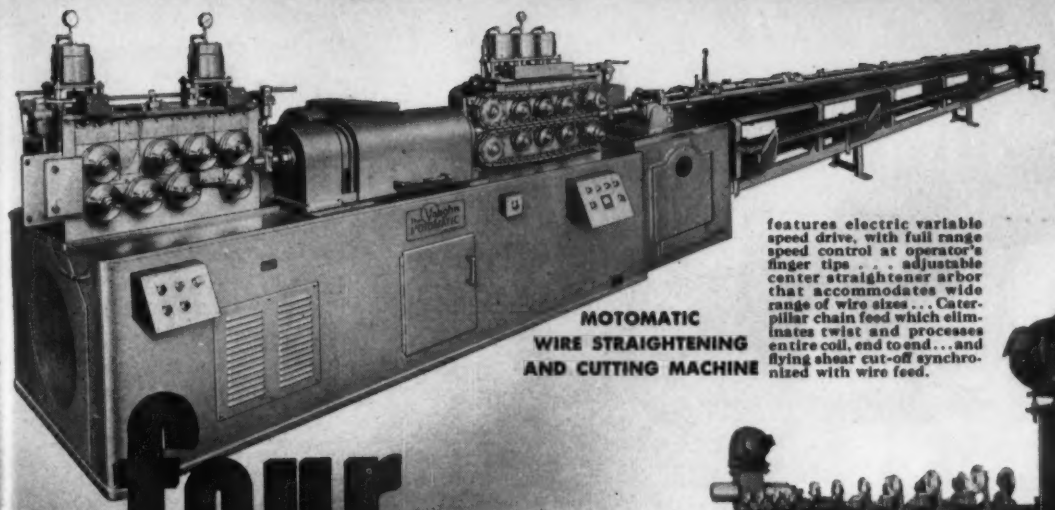
Eagle Power — Aerojet-General Corp.'s Solid Rocket plant at Sacramento has a subcontract for more than $8 million from Grumman Aircraft Engineering Corp. It is for the development of a high-performance rocket power plant for the Navy's newest air-to-air guided missile, the Eagle.

New Northern Outlet—Pangborn Canada, Ltd., has been incorporated to market the complete line of blast cleaning and dust control equipment and metal abrasives produced by Pangborn Corp., Hagerstown, Md. Offices are located at 38 Mattson Rd., Toronto.

Name Change—Rochester Div., Consolidated Electrodynamics Corp., Rochester, N. Y., manufacturers of high vacuum equipment and environmental test apparatus, is now known as Consolidated Vacuum Corp.

Midwest Move—Steel Warehousing Div., Jessop Steel Co., has moved to 25th Ave. at Cermak Rd., Broadview, Ill.

Into Detroit — Formsprag Co., Warren (Detroit), Mich., has purchased the Rawson Div., O. S. Walker Co., Worcester, Mass. Operations will be transferred to the Detroit area. The Rawson Div. has been the manufacturer of a patented centrifugal clutch used by industry.



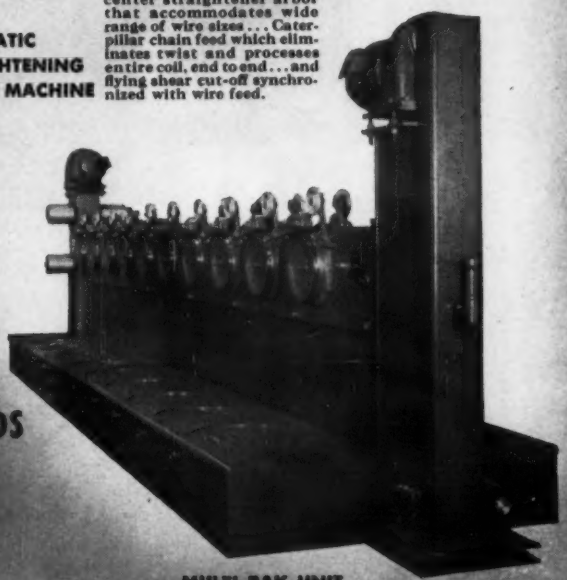
MOTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINE

features electric variable speed drive, with full range speed control at operator's finger tips . . . adjustable center straightener arbor that accommodates wide range of wire sizes . . . Caterpillar chain feed which eliminates twist and processes entire coil, end to end . . . and flying shear cut-off synchronized with wire feed.

four NEW VAUGHN PRODUCTS

TO MEET THE WIRE INDUSTRY'S DEMANDS

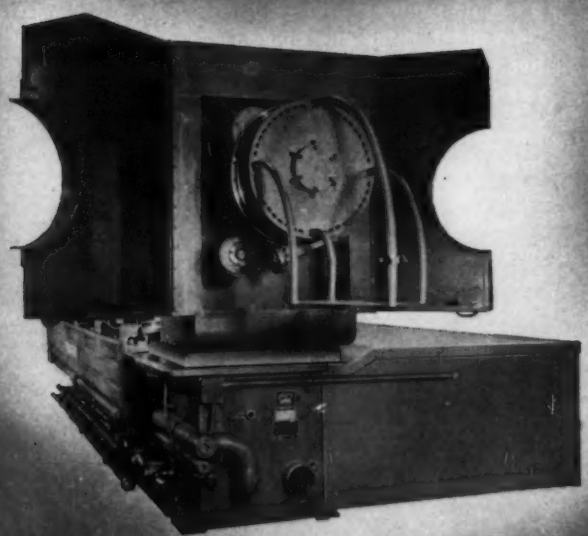
- *for high speed, heavyweight coils . . .*
- *for wire laid in pay-off packs . . .*
- *for straight, precision-cut length wire . . .*

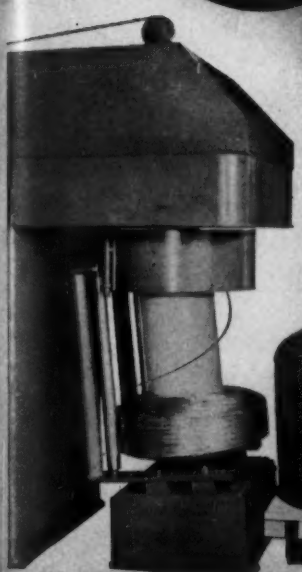


MULTI-PAK UNIT (20 strand)

for faster, more efficient laying of wire in pay-off packs, drums or pails

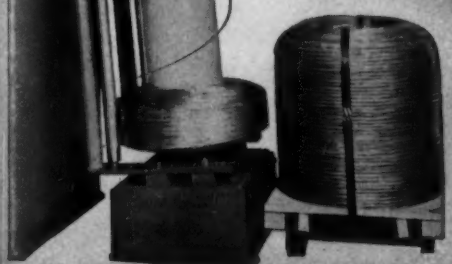
MODERN Vaughn EQUIPMENT





STATIONARY BLOCKS

for drawing and/or coiling to provide heavy weight compact coils. Available in either horizontal or inverted vertical designs.
16½ Gauge Galvanized Low Carbon Wire • Coil Weight—1611# Coil I.D.—14" • Coil O.D.—39" Coil Height—39"



Large Size Wire Bundle made on Stationary Block

STATIONARY DRAWING BLOCK CONVERSION UNIT

which can be substituted for conventional finishing block on existing MOTOBLOK, to provide continuous drawing of heavy weight coils at high speed.

The VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys

Forging Ohio Rolls

to shape metal for all Industry

. . . this 2,500 ton forging press, now in operation at the Lima plant, is the latest member of Ohio Steel's family of roll producing equipment.

The giant manipulator, overhead crane and banks of the latest in car type gas fired furnaces complete this new forging facility — A modern facility with which to produce Ohio Forged Steel Rolls.

The Ohio Steel Foundry Co.

LIMA, OHIO ... *Vertically at the center of the steel industry*

PLANTS AT LIMA AND SPRINGFIELD, OHIO

OHIO IRON AND STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

C. H. Pilcher, elected vice president, industrial relations, ACF Industries, Inc.

U. S. Steel Corp.—**W. H. Lang,** elected administrative vice president and treasurer.

Nice Ball Bearing Co.—**T. E. Spence,** becomes vice president, engineering; **F. Russell,** becomes chief engineer.

American - Standard Industrial Div.—**Albert O'B. Andrews,** appointed president, Detroit headquarters.

American Forge & Mfg. Co.—**H. W. McLaughlin, Jr.,** named secretary and asst. to the president.

Reynolds Metals Co. — **P. C. Koeber,** promoted distributor coordinator, architectural and building products.

Yuba Consolidated Industries, Inc.—**K. A. Gardner,** named vice president, engineering.

Metal Goods Corp.—**J. H. Harwood,** elected secretary-treasurer.

Wheeling Steel Corp.—**L. N. McCutcheon,** appointed manager, Boston district sales office.

Republic Steel Corp., Wire Div. —**A. C. Broholm,** appointed asst. manager, sales, Chicago headquarters.

Alan Wood Steel Co.—**J. E. Ripple,** promoted to superintendent, blooming mill and plate mill.

Allis-Chalmers Mfg. Co., Construction Machinery Div—**J. A. Scoggin,** named general service manager; **J. T. Skinner,** appointed sales manager, Deerfield Products, and **F. C. Schessler,** appointed asst. sales manager, Deerfield Products.

Oakite Products, Inc., South Pacific Coast Div.—**T. A. Rohlfsen,** appointed manager.

Ex-Cell-O Corp.—**A. J. Kirchner,** appointed manager, export sales.

Associated Spring Corp., Gibson Div.—**E. H. Judd,** appointed factory manager.

D. K. Wright, named manager, tin mill products, U. S. Steel Corp.

The Torrington Manufacturing Co., Machine Div.—**E. E. Franks, Jr.,** appointed district sales manager, Chicago.

Hydraulic Press Mfg. Co.—**R. W. Neitzel,** appointed controller.

The Elwell-Parker Electric Co.— **R. G. Vance,** named chief development engineer, Cleveland.

H. M. Harper Co. — **George Fischle,** appointed New York area district manager.

Arwood Precision Casting Corp.

(Continued on P. 194)

R. B. Meneilly, appointed general manager, tin mill products, U. S. Steel Corp.

W. T. Gettig, named vice president and general manager, LFM Mfg. Co., Atchison, Kan.

M. J. Day, named vice president, commercial, Crucible Steel Co. of America.

(Continued from P. 193)

J. G. Solari, appointed vice president, sales, Great Lakes Carbon Corp.'s Carbon Div.

—**George Main,** appointed asst. sales manager.

North American Refractories Co., Specialties Div.—**J. P. Maddox,** appointed manager.

Wheeling Steel Corp. — **A. W. Gittins,** named division superintendent, primary production, Steubenville Works.

Rotex Punch Co., Inc.—**Frank Colbourn,** appointed general manager.

Cooper Alloy Corp., Foundry Products Div.—**W. G. Cook, Jr.,** appointed sales engineer, New England area; **H. G. Haucke,** appointed sales engineer, Philadelphia area.

Minneapolis-Moline Co., Engineering Div.—**R. B. Singer,** named manager, Experimental Dept.

Alco Products, Inc. — **John Gronan,** appointed chief project engineer, Nuclear Power Engineering Dept.

H. K. Porter Co., Inc., Vulcan-Kidd Steel Div.—**J. E. Hinzman,** appointed manager, research and development, Aliquippa, Pa.

Robertshaw-Fulton Controls Co., Fulton Sylphon Div.—**A. G. Baitz,** named director, sales training.

Consolidated Electrodynamics Corp., DataTape Div. — **H. I. Chambers,** appointed associate director.

USI Robodyne, Div of U. S. Industries, Inc.—**S. S. Podnos,** appointed general manager.

Potter & Brumfield, Div. of American Machine & Foundry Co. —**C. R. Stone,** named chief production engineer.

Diamond Chain Co., Inc., subsidiary of American Steel Foundries —**E. W. Allen,** named director, purchases.

The National Supply Co.—**R. W. Colebrook,** appointed chief engineer, hydraulic drives.

Hobart Brothers Co. — **P. L. Scott,** named district sales manager, Southeastern states.

Robert Cushman, appointed general sales manager, Abrasive Div., Norton Co., Worcester, Mass.

Smith Welding Equipment Corp. —**D. E. Cummings,** appointed St. Louis territory manager; **C. G. Westerson,** promoted to southeastern district manager.

J. H. Williams & Co.—**J. F. Schleifer,** promoted to superintendent, finishing.

Michigan Abrasive Co.—**R. P. Villwock,** appointed research engineer.

Byron Jackson Pumps, Inc.— **E. W. Stegman,** appointed district manager, Birmingham (Ala.) office.

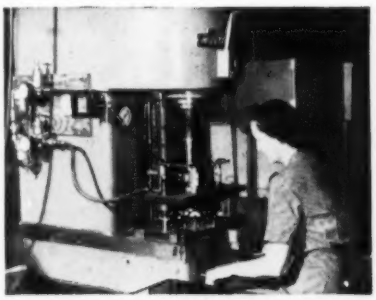
Consolidated Electrodynamics Corp. — **J. E. Jenkins,** appointed marketing manager, DataTape products.

W. E. Gregg, named director of technology, Technology Dept., Crucible Steel Co. of America.

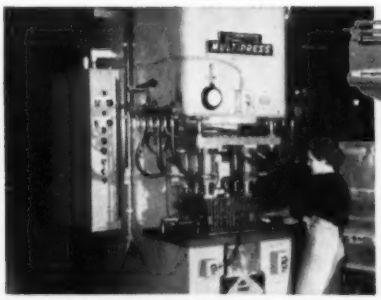
W. C. Fischer, appointed director, engineering, Fairbanks, Morse & Co.

G. O. Pfaff, appointed director, marketing, Wheelabrator Corp., Mishawaka, Ind.

Which of these MULTIPRESS ideas will save you money...NOW?



Toy maker forms 1000 parts per hour . . . 8-ton Multipress forms metal toys faster, at less cost for Mattel, Inc.



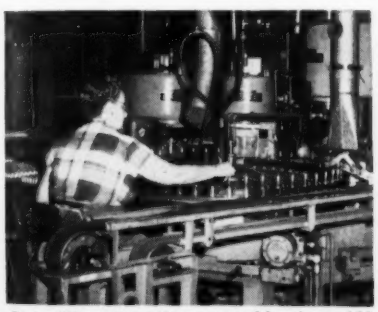
Motorola speeds production...with 100-ton Multipress that precision-punches up to 450 holes at a time in plastic TV chassis bases.

Dormeyer triples production of food mixer parts . . cuts scrap loss, too, with 8-ton Denison Multipress—12-station index table.

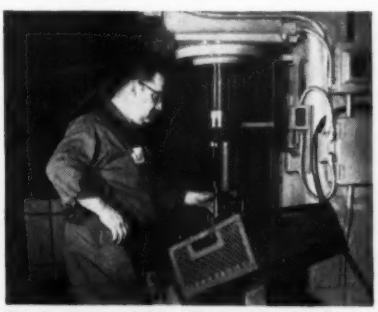
Waterman boosts output 800% with 1-ton Multipress that "angles" precision C/C pen parts fast, at low cost.

Cuts cost 73% on sub-assembly of specialty products at George S Thompson Corp with 4-ton Multipress. Savings—11¢ per unit.

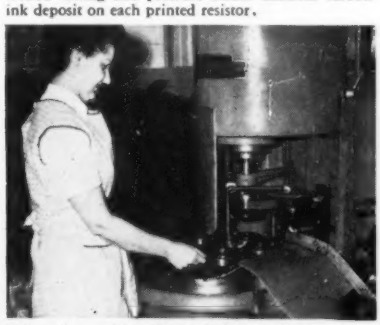
Prints Electronic circuits 3 times as fast at Barry Process Co. with 4-ton Multipress. Controlled timing and pressure assure uniform carbon ink deposit on each printed resistor.



Auto-lite automates assembly of over 150 different types of spark plugs with a battery of 3 Multipresses operating around a 48-station index table.



Production up 33% at Cleveland Graphite Bronze—where 25-ton Multipress compresses soft carbon cores at the rate of 100 per hour.



Trimming rubber flash twice as fast... 4-ton Multipress with 6-station index table trims flash from 2400 molded rubber parts per hour. Old method called for 3 operations.

Time and money savings like these are only a few of hundreds that Denison Multipress can help you make in keeping ahead of competition today.

But modern competition means more than simply faster production. That's why *Multipress plus-benefits* are so *important.*

Multipress on your job can mean larger tool and die life . . . less scrap . . . higher product quality . . . minimum maintenance . . . extra operator safety. *Multipress can give you the competitive edge.*

Isn't it time *you* looked into Multipress? Your Denison Hydraulic Specialist can show you where and how Multipress will pay off best on your next job.

TOOLING AND PRODUCTION MEN! WRITE FOR YOUR COPY of the new DENISON MULTIPRESS all-line catalog 120-D. Specifications and application data for all-industry uses. Multipress 1 to 75-ton capacities.

DENISON ENGINEERING DIVISION
American Brake Shoe Co.
1242 Dublin Road • Columbus 16, Ohio

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DENISON HydrOILics

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

PONTIAC fender, formed in a severe, one-hit drawing operation, is made of J&L drawing quality, cold rolled oiled sheet.

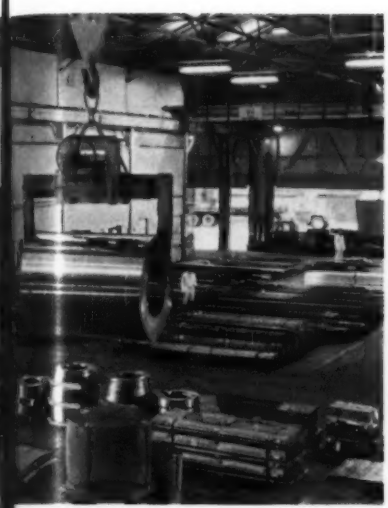
INTERNATIONAL HARVESTER utilizes the strength of J&L steel in rugged earth moving equipment manufactured by Construction Equipment Division.

E. F. HAUSERMAN COMPANY secures uniform flatness from coils of J&L sheet steel for its colorful, versatile movable wall partitions.

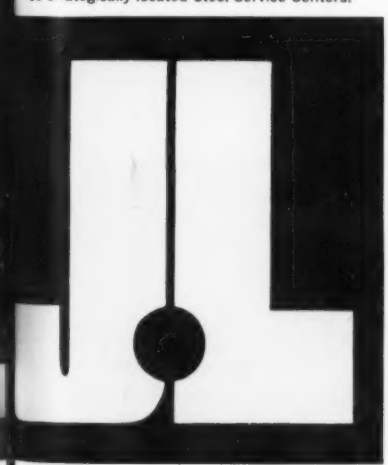
So easy to form, so flat,
so strong, so uniform...

no wonder so many
of America's leading
manufacturers use

J&L sheet steel



TAKE PLANNED ADVANTAGE of the many services available through J&L Warehouse Division's 13 strategically located Steel Service Centers.



Modern production methods and styling make increasing demands on sheet steel:

It shouldn't deviate in strength or finish—auto makers must double draw steel into sweeping curves and deep contours.

It shouldn't buckle—appliance, office equipment and furniture manufacturers want wide, strong planes that need no bracing.

It shouldn't wear, break or corrode—heavy equipment builders want tough steels that stand the bounce of heavy boulders and the grinding of abrasive gravel.

To provide the steels that meet these requirements, J&L invested nearly $800 million in new equipment and facilities.

These include a new 46-inch, high lift blooming mill—a new automatic oxygen scarfer—a new 80-inch four-high reversing rougher—a new horizontal scale breaker—a new cold reducing mill—a new cold shear line—new annealing furnaces—a new 56-inch temper mill—a new 44-inch hot strip mill.

The result? J&L sheet steels are remarkably ductile, strong, flat—sheet after sheet after sheet.

You can see why so many of the things you use and enjoy every day are made of J&L steel.

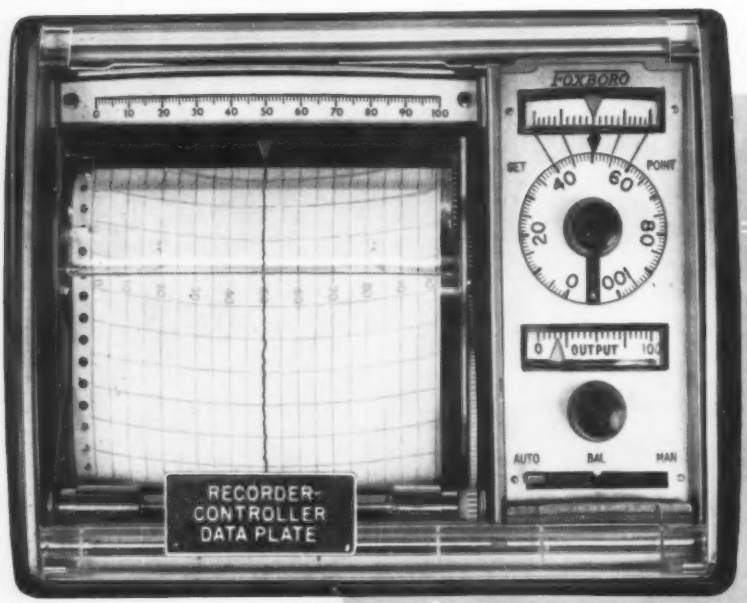
Jones & Laughlin Steel Corporation

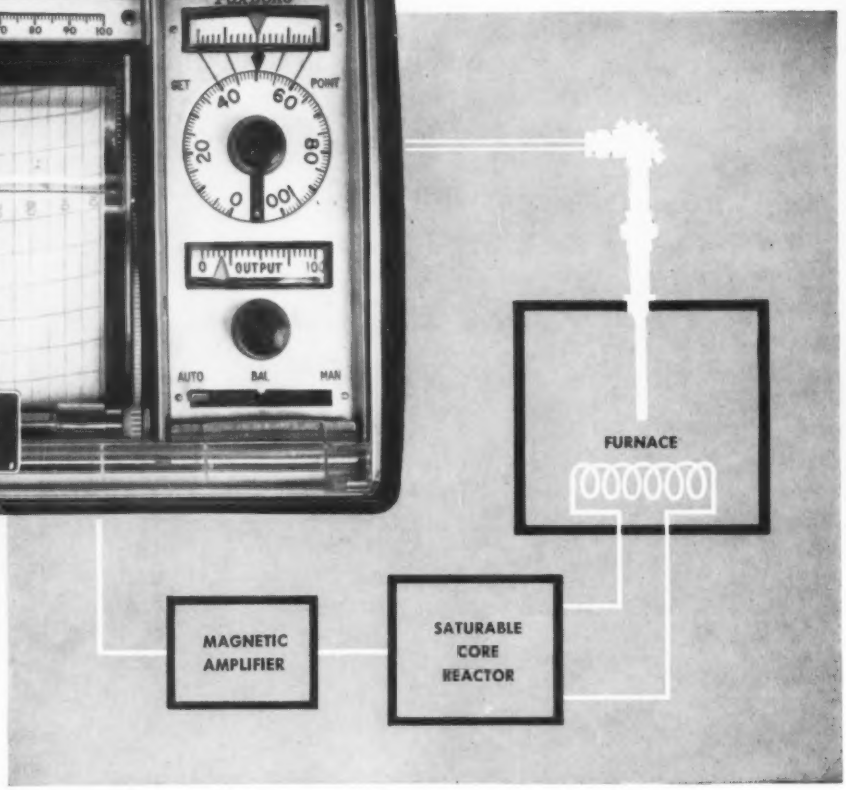
PITTSBURGH, PENNSYLVANIA

RCA WHIRLPOOL is a major user of consistent quality J&L sheet steel in these 24" washers produced in modern Clyde, Ohio, plant.

NOW BEING INTRODUCED by J&L, these colorful, plastic-clad steel containers are made of J&L zinc-coated sheets for patio, utility room or yard.

new
from
Foxboro





Electronic Consotrol Recorder and Controller operate (and pull out) independently. Shown above, grouped in 6" x 9" housing, they can also be mounted in separate housings for complete flexibility in panel arrangement.

TUBELESS ELECTRONIC TEMPERATURE CONTROL
for Electric Furnaces

Accurate, instantaneous temperature control . . . complete elimination of vacuum tubes . . . easy-to-read 4-inch chart records. You get this — and more — with Foxboro's new Electronic Consotrol* System for saturable core reactors.

The Foxboro Electronic Consotrol System uses multi-stage magnetic amplifiers, and other lifetime components, to convert thermocouple measurement to proportional high-level d-c signals. The system can be used with any standard saturable core reactor as the final control operator.

There are no moving parts — no vacuum tubes in this highly sensitive, highly reliable control system. Special skills are not needed for routine maintenance.

Find out what Foxboro Electronic Consotrol Instrumentation can mean in better proportioning control for your furnaces. Write for Bulletin 21-10A today. It gives complete details. **The Foxboro Company, 8010 Neponset Avenue, Foxboro, Massachusetts.**

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ELECTRONIC CONSOTROL INSTRUMENTATION

How To Get More For Your Metalworking Dollar

Coated Metals

With Nonmetallic Finishes

IN THIS FEATURE

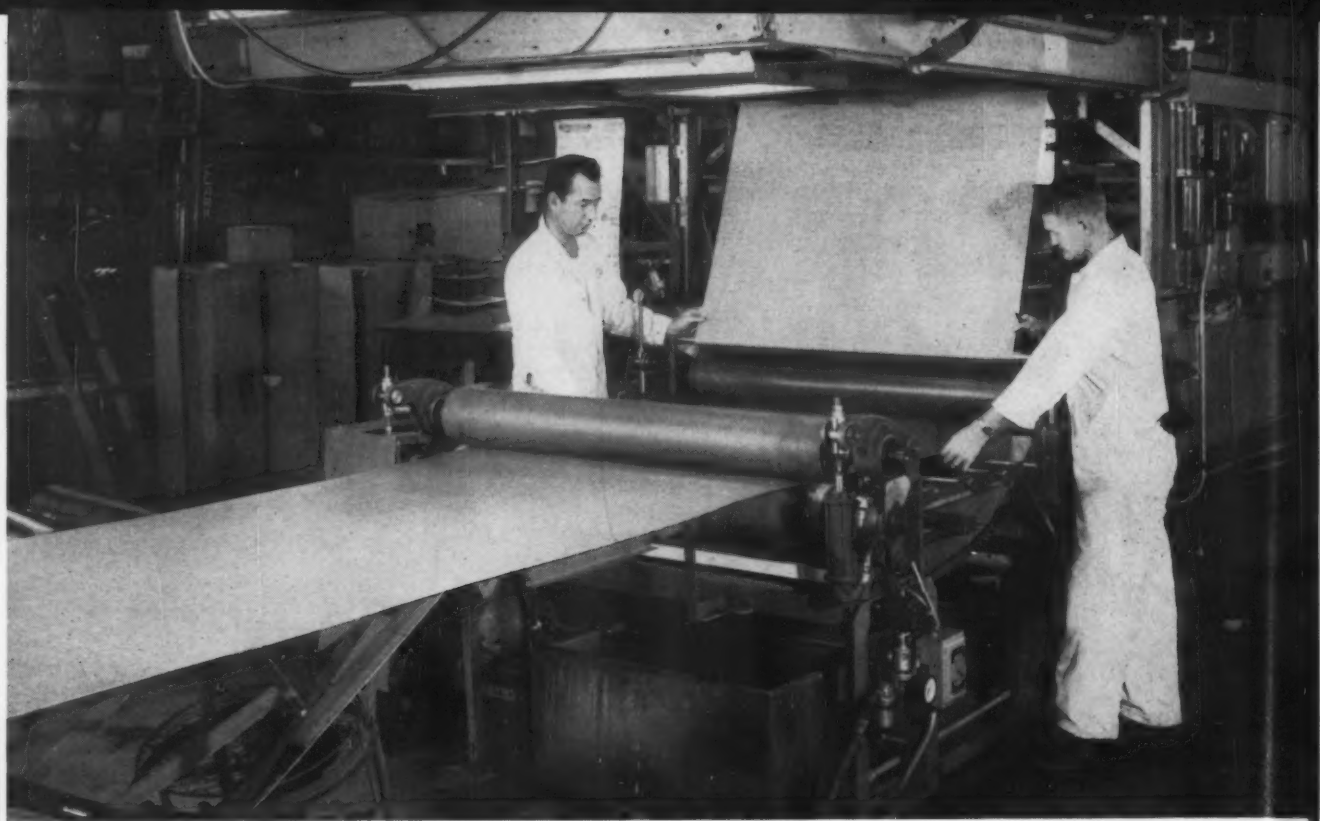
Ask the producers of metal products about today's finishes and they'll tell you that they're the best ever.

"We're using finishing materials that hold up better than anything we've had before. And our methods of application and equipment are the very latest. Ours is truly a highly efficient operation."

When you've got that kind of operation, it's quite understandable if you should sit back with satisfaction. After all, your product already is of such quality and has enough sales appeal to at least keep you on a par with your competitor, or perhaps even one jump ahead of him.

But you, as an alert executive, can't overlook a strong trend that's growing stronger by the day. It's that of making your product from pre-finished metal. In effect, when you buy coated sheet or strip you hire your supplier as your chief technologist and finishing department with no strings attached.

Look into it. You may save many extra dollars. Certainly, you can't lose.



Clad-Rex Corp.

LAMINATING LINE: Continuous process bonds vinyl sheet to steel substrate, forming tough laminate.

Why Switch to Coated Metals?

Sales of pre-coated sheet and strip have taken a sharp upswing. The number of uses, likewise, have taken some giant steps.

What's behind this trend?

■ If you've been reluctant to switch to pre-coated metals because they cost more than the materials you're now using, check both out through your fabricating line, then compare the end-product costs. You may find that you haven't been stretching every dollar as far as it should go.

Or, perhaps you felt that pre-coated stock didn't give you the variety of finishes you needed. Here, too, it'll pay you to re-examine what is available.

Almost No Limit—You can get pre-coated sheet and strip in practically any mill thickness you desire. Width of stock will range from ¼ in. to 48 in., depending on the mill's upper rolling limits.

As for the coatings, you can have paint, lacquer, phosphate, vinyl laminate, vinyl plastisol, polyester or other materials in thicknesses best suited to your products. The variety of colors and patterns is so abundant that selection may be more of a problem than if there was a lack of variety.

Among the plastic coatings, perhaps the most widely used is a calendered semi-rigid poly-vinyl chloride film laminated to sheet metal, and commonly called a vinyl-metal laminate. Many alloys and tempers of steel (galvanized, electrolytically coated and aluminized), aluminum and magnesium are used as a base.

Another coating that has found fast and wide acceptance is the vinyl plastisol. This coating material involves curing and bonding to sheet or coil stock (cold-rolled or galvanized steel) in a continuous mill operation.

Newcomer—A more recent addition to the coating scene is a polyester film that can be applied to coil stock. In this process, the

strip can be decorated in any pattern that can be photographed. Although the polyester film has been used before for coating steel, it had been applied to sheet stock only.

Among the paints, several basic types are used extensively to pre-coat both ferrous and nonferrous metals — vinyl, synthetic polymer, acrylic and amine-alkyd formulations. All have exceptionally good resistance to exposure.

The merits of anodized finishes on aluminum, and chemical conversion coatings on aluminum and magnesium, are well known. Here, too, improvements in the respective processes gives these metals the finishes they need for forming without damage.

How Do You Gain?—The benefits of using pre-coated metals are many regardless of the base or coating you may choose. First, it frees you of maintaining your own finishing department, thus saving on capital equipment costs, direct labor costs and space. Because of this, your processing costs will be much lower.

The time you save in processing cannot be overlooked either. By eliminating the finishing steps, the potential of your plant's capacity increases.

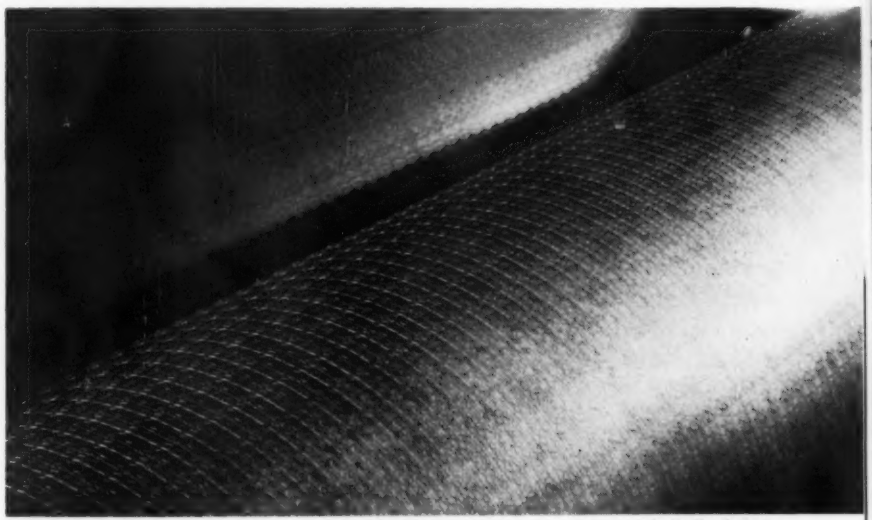
Insurance is another area where you can save, particularly if your present finishing department handles highly flammable substances. With pre-coated stock, you have no such risk nor the expense that goes with it.

Still another benefit is that you no longer need to be a paint technologist or a finishing expert. Your supplier takes over that job automatically with the first order. He keeps up with the fast moving developments on coatings because that's his business, and he stands ready to keep you abreast of information which can improve your product quality.

Get Fewer Rejects—The reject rate with pre-coated metals is generally very low. First of all, you start with material that has the desired finish. There's no need for refinishing due to faulty work or equipment. You're assured of that before you begin the costly forming operations.

Will the forming operations damage the coating? Virtually all pre-coated materials have excellent abrasion resistance. As such, forming can be done without taking any special precautions. And because the coating materials were intended to withstand fabrication, they won't chip, crack, tear, peel or otherwise become damaged when used under the conditions for which they've been specified.

Hold up Well—The toughness of the coating materials and their adhesion to the base metal are such as to permit roll forming, bending, shearing, crimping, stamping, drawing and perforating in high-speed manufacturing. In fact, some of the coatings' properties exceed those of the metal itself.



U. S. Steel Corp.

EMBOSSING ROLL: This is only one of unlimited designs possible by rolling pattern onto vinyl plastisol coating before cooling occurs.

APPLYING PAINT (below): These two lines, one a 36-in. (left) and the other 18-in., coat both sides of aluminum strip at 60 feet per min.

Reynolds Metals Co.

Built-in Sales Appeal Pays Off

The best materials you can buy only promise you better sales of your products.

But combine them with exciting colors, interesting patterns and good design, and you're bound to get a bigger piece of the market.

■ Talk to some metalworking executives about earning more profit by using a more expensive material and they'll raise all kinds of doubts. "How do we go about it without pricing ourselves out of the market?"

Actually, too many manufacturers have already done just that to prove that it's no secret. Taking the plastic-on-metal materials as a case in point, some product manufacturers have pioneered their use with such success that they've established themselves as leaders in their respective fields. Others have set up trends within an industry by their new styling. Some have only begun to use these materials. Still others are evaluating them for the day when they too can reap their advantages.

Boost to Industry—Whatever the reasons, the plastic-on-metal materials have caught on at such a rate, and for so many products, that they've had a profound effect on the industry.

Five short years ago, production of the vinyl-metal laminates amounted to about one million sq ft. Three years later, this figure jumped to 18 million sq ft. Production for 1960 has been estimated variously at between 115 and 150 million sq ft. This gives you some idea of the rate at which this one product has climbed. Product lines competitive to the vinyl-metal laminates are likewise on the uptrend.

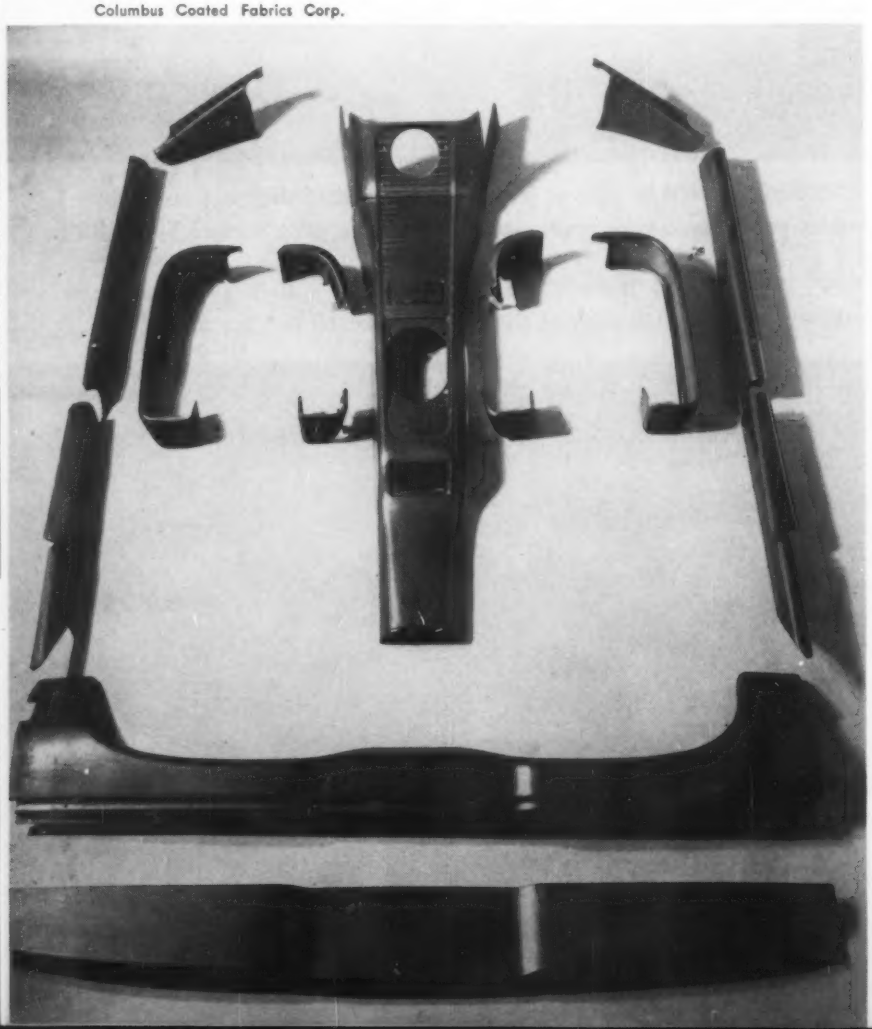
Future Looks Good—In talking about the future of vinyl-coated steel sheets, B. E. Estes, Jr., U. S. Steel's vice president of marketing threw in an optimistic note. He revealed that a recent test marketing program showed "sizable markets with healthy growth potentials" await the vinyl-coated material.

He pointed out, too, that the lag between product acceptance and its appliance in force is merely a matter of time until designers and fabricators complete redesign of their products to take full advantage of the material's many qualities.

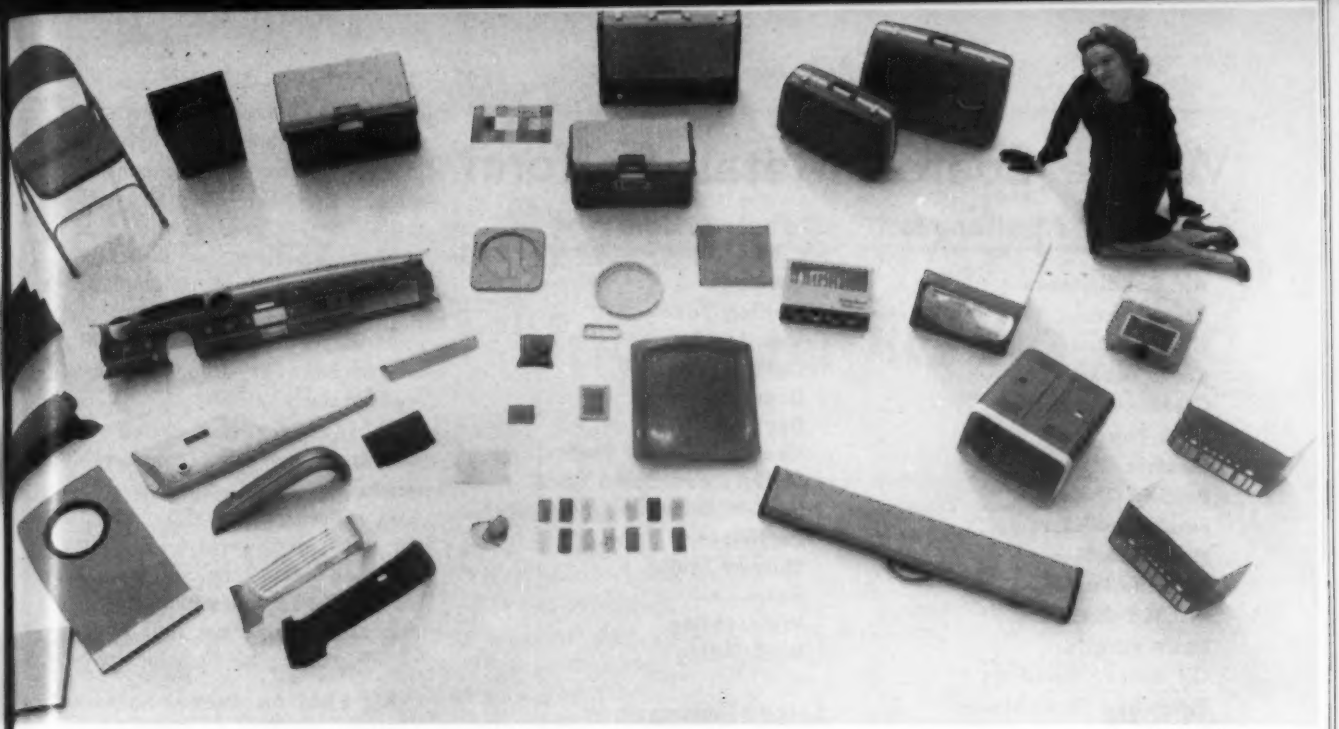
Market for Steel—It's significant to note the great and active interest steel companies have taken in this program. Mr. Estes puts it this way, "We emphasize our desire to promote the total market for plastic-coated steels, whether coated at the mill or by a specialty manufacturer. Basically, we are promoting steel."

In making these comments, Mr. Estes expressed what other steel

Columbus Coated Fabrics Corp.



READY TO USE: Ford's Thunderbird uses these parts of precoated vinyl metal laminate.



U. S. Rubber Co.

VARIETY IN DESIGN: Vinyl-metal laminates fit into production techniques of a wide variety of products.

executives might have said. It's a defense to the strong challenge that nonferrous products have made upon steel. At the same time, it has created new markets.

Others in Field—Beside U. S. Steel, other steel companies are doing something about getting a piece of this potentially huge market. Less than a year ago, National Steel Corp. acquired the Enamelstrip Corp., Allentown, Pa. Construction is now underway on a high-speed 48-in. coil line which will add greatly to the company's output capacity.

Thomas Strip Div. has long been an outlet for much of Pittsburgh Steel's strip. The Clad-Rex Corp., formerly a metal-cladding company, has switched completely to laminating vinyl with metal.

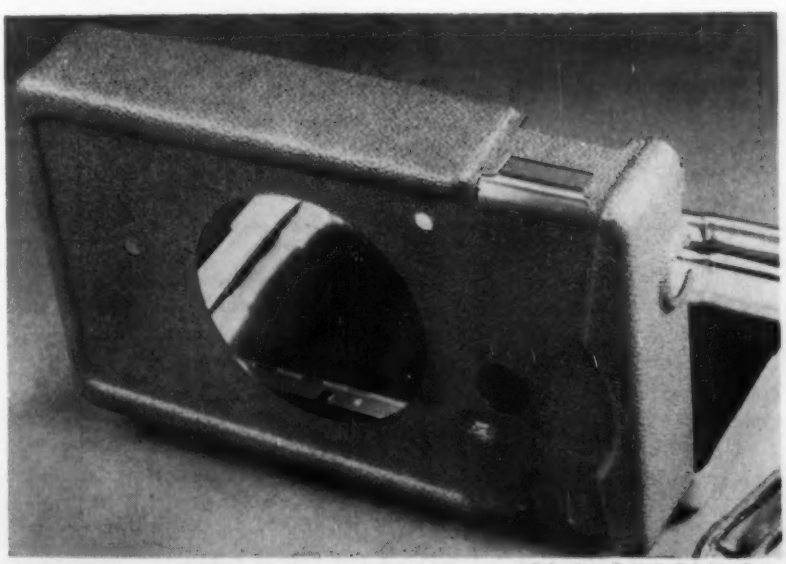
Jones & Laughlin, Acme Steel, as well as U. S. Steel, still hold licensing agreements for U. S. Rubber's Marvibond process. More recently, Ford became a licensee of the Marvibond process and will be the first company to make its own vinyl film and steel for laminating.

What It Means—The entry of steel companies into this field means just one thing—that there's an incentive for earnings now, and they're prepared for the day when the trend to precoated metals hits its peak.

Many alert manufacturers have been users of these materials for some years. In fact, they've pioneered the applications. Shwayder Bros., Inc., Denver, for example, has achieved world wide popularity for its vinyl-to-magnesium luggage.

Venetian blind manufacturers, once torn between wood and metal slats, have just about settled entirely on prepainted steel or aluminum.

How Markets Change — Table model radio cabinets, once made of wood, sheet metal, then molded plastic, are again returning to sheet metal. But this time, it's precoated



Columbus Coated Fabrics Corp.

COMPLEX SHAPES: Transistor radio case made by Arvin Industries shows how vinyl withstands complex drawing and welding of internal clips.

Where Coated Metals Perform

Furniture, Appliances

- Air Conditioners
- Bread Boxes
- Cabinet Doors
- Card Tables
- Clothes Hampers
- Desk Tops
- Electric Dryers
- Folding Chairs
- Food Cannisters
- Humidifiers
- Juvenile Furniture
- Kitchen Cabinets
- Lawn Furniture
- Oil Burner Housings
- Radio and TV Cabinets
- Refrigerators
- School Seating
- Table Tops
- Venetian Blinds
- Washing Machines
- Waste Baskets
- Water Coolers

Transportation

- Arm Rests
- Baggage Racks
- Ceiling Panels
- Instrument Panels
- Interior Door Panels
- Seat Backs
- Side Panels
- Station Wagon Flooring
- Trailer Body Panels
- Trim
- Window Frames

Construction

- Awnings
- Ceiling Panels
- Counter Tops
- Curtain Walls
- Doors
- Ductwork
- Electrical Cover Plates
- Gutters and Down Spouts
- Industrial Roofing
- Partitions
- Shower Stalls
- Sinks
- Wainscoting
- Wall Siding

Miscellaneous

- Advertising Displays
- Boat Decks and Partitions
- Bottle Caps
- Business Machine Housings
- Camera Shells
- Containers
- Gun Cases
- Highway Signs
- Ice Chests
- Luggage
- Magnetic Bulletin Boards
- Movie and Slide Projectors
- Packaging
- Picnic Jugs
- Steel Drums
- Tackle Boxes
- Telephone Cases
- Toys
- Trunks
- Typewriter Cases
- Vending Machines

with plastic or paint.

Prepainted and plastic-coated steel television cabinets have also sliced deeply into a market where wood held the lion's share. The precoated stock not only lends extra style and durability to the cabinets, but saves about 40 pct over previous methods and materials of production.

Wood-grain patterns of all types are being simulated on plastic-coated metal by embossing or photographic techniques. The market for interior paneling, again held largely by wood, is now giving ground to these newer materials.

Transportation Big User — The automotive industry generally has given great acceptance to the plastic-coated steels. These materials are "naturals" for the automotive stylist. They're economical, strong, and they give the stylist unlimited patterns, colors and textures to work with. Although the vinyl-coated steels are used almost exclusively for car interiors, consideration is also being given to exterior styling.

Buses, trains and airliners, likewise, make extensive use of plastic-coated steel and aluminum for interior styling. Here, durability is extremely important to resist scuffing and scratching.

The use of a vinyl-coated steel for bus coaches saves considerably on masking and papering time. Also, since the material is highly abrasion-resistant, there's no time spent on retouching. Builders of home trailers estimate that they can save about $500. per unit by not having painting or finishing to do.

Big Field for Paints—So many products can now be formed from prepainted sheet and strip that many plants can give up their finishing line and never have need for it again. Items such as toys, bottle caps, film containers, buckles, kitchen aids, ashtrays, flashlight batteries, movie reels and molding are only a few of the scores of uses.

Yet, as J. Raven, plant manager, Enamel Products & Plating Co. puts it, "We think the concept of pre-enameled metal is still in its infancy." He feels that despite what has already been done with prepainted stock, many manufacturers have yet to redesign their products to take advantage of its economy and quality.

Look Ahead—Of the many advantages that precoated strip and sheet offer, its potential for styling is perhaps its greatest. You can achieve the feel of fine linen, the texture of leather, the warmth of grained wood, the appearance of marble, and in any color of a rainbow. The possibilities even go beyond the imagination of the stylist or designer. For example, one producer of pre-coated stock offers 500 different wood grain patterns.

Just as long as consumers demand individuality in style, color, texture or any other aesthetic qualities, the producers will be able to supply them.

Properties Stand Up to Service Under Rigid Testing

Whether it be for resistance to abrasion, weathering chemicals or heat, the real test of a material comes from actual use.

But, here's how coated metals held up under conditions that you normally won't get the service.

■ When you buy any precoated material, you're buying appearance that will help sell your product, workability to make your job easier, and durability so your customers will come back for another purchase.

What goes into that material is up to the producer, but it's assuring to know what the producer has done to check out all the properties that are important to your products' service.

All sorts of tests have been made on precoated stock—some standard, others quite unorthodox. But, all of them have been performed to first test the upper limits of these materials, and to prove that they will serve under conditions far beyond their intended use.

What About Stains?—The producers say that their materials are stain-resistant or non-staining. What stains will they resist?

In tests on vinyl-coated steel, specimens were held under glass for wet exposure for 48 hr at room temperature. Substances as ink eradicator, India ink, lighter fluid, gasoline and nail polish remover left no stains whatsoever.

Other substances such as mercurochrome, nail polish, writing ink, cough syrup and hair wave set stained the vinyl, but these stains were easily removed with a standard household cleaner. Permanent staining occurred from lipstick, mustard, tincture of iodine, stamp pad ink, and ball-point pen ink.

Even Dye Comes Off—Another producer with stain-resistance specifically in mind for white vinyl sheeting, formulated a finish that has resisted every stain tested, including black and red hair dyes,

Clad-Rex Corp.

TOLERATES ACIDS: Vinyl-metal laminates have exceptional resistance to acids for extended periods.

ball-point pen ink, tincture of iodine and gentian violet.

Polyester film on metal, likewise, has been tested for many stains such as mustard, port wine, coffee, wax crayon, shoe polish, beet juice, dye, ink as well as other stubborn substances. In each case, the stain had no effect on the finish.

Withstands Humidity — Because resistance to humidity is often one of the essential requirements of plastic-coated metals, producers perform severe tests for this property as a regular part of their quality control program.

On vinyl-coated steel, for example, specimens must retain good adhesion after first elongating them 30 pct, then subjecting them to immersion in 80°F tap water for 240 hr, or exposing them to 100-pct relative humidity at 100°F for 200 hr. After such exposure, the vinyl-to-metal bond must withstand at least a 22-lb pull for each inch of coated metal width.

Some Properties of Vinyl-Metal Laminates

Physical Properties*

Tensile strength, psi	4400
Elongation, pct	170
Tear strength, lb/in.	910
Bend brittle, ¼-in. rod, °C	−5
Heat deformation, @ 120 °C, 2000-g load, pct	32
Shrinkage, 5 min. @ 250 °F, pct, with cal. gr.	4.6
across cal. gr.	1.6

Abrasion Resistance

(Taber abrader with CS-10 wheel)

Finish	Film Thickness, mils	Revolutions per mil
Vinyl Laminate	8.5	2100
Phenolic	1.25	1000
Urea-alkyd	1.70	72
Vinyl lacquer	2.0 (Av.)	351–477

Chemical Resistance

(Cup tests at 150 °F)

	Vinyl-Metal Laminate		Phenolic		Alkyd	
Chemical	Days	Result	Days	Result	Days	Result
Sulfuric acid, 10 pct	17	OK	2	Failed	2	Failed
Nitric acid, 10 pct	17	OK	2	Failed	2	Failed
Hydrochloric acid, 10 pct	17	OK	2	Failed	2	Failed
Acetic acid, 10 pct	17	OK	2	Failed	2	Failed
Lactic acid, 10 pct	17	OK	17	Failed	2	Failed
Formaldehyde, 10 pct	11	Swelled	2	Failed	2	Failed
Caustic potash, 10 pct	17	OK	3	Failed	2	Failed
Distilled water	17	OK	17	Failed	2	Failed
Mineral oil	17	OK	17	OK	17	OK
Ethanol	17	Slight Shrinkage	17	OK	17	OK

Moisture Resistance

(Exposure 1000 hr, 160 °F, humidity 100 pct)

	Creep	Blistering	Adhesion
Vinyl-Metal Laminate	None	None	Good

In other tests, vinyl-metal laminated panels remained in excellent condition after being exposed for 1000 hr to 100-pct relative humidity at 160°F. The only effects from such exposure were slight color change and some loss of gloss due to moisture absorption. Intermittent water spray at ambient temperatures for one year showed no failures or deterioration.

Can Take Beating—Uses and potential uses for plastic-coated metals indicate that resistance to scuffing and abrasion are absolute requirements. Tests show that these requirements are being met remarkably well.

For example, a vinyl-metal laminate tested in a Taber Abrader, using a CS-10 wheel, lasted for 2100 revolutions per mil of coating thickness. By comparison, a phenolic coating wore half as well, a vinyl lacquer coating one-fifth as well, and a urea-alkyd finish only about one-thirtieth as well.

Texture an Asset — Thickness, texture, and resilience of vinyl-coated metals give them the ability to conceal scratches and abrasions. Scratches a couple thousandths of an inch deep, or very narrow ones, on finished wood or painted surfaces would mar their appearance noticeably. Although vinyl may be scratched, its resilience and texture tend to hide such scratches to a point where they're almost invisible.

In a constant-load scrape test, four different materials were tested for abrasion by pulling the specimens under a knife edge. Of the four, the vinyl-coated steel specimens showed little or no damage. The rougher textures held up best under this test.

Abrasion Varies—The remaining three materials had varying degrees of damage. A phenolic-resin surface exhibited only hairline damage; baked enamel was scraped from the metal surface; linoleum showed positive scratches.

Two other tests were performed on the same four materials. One tested the surfaces against the

effects of a commercial shot-blasting machine. The second checked for abrasion resistance of the surface in a ball mill, the type used to grind frits for porcelain enamels. In both tests, the degree of damage, or lack of it, was about the same as in the scrape test. The vinyl on steel proved to be superior.

Resists Many Chemicals — The vinyl-coated metals have been exposed to a great many chemicals, ranging from household detergents to concentrated acids. Their resistance is generally very good. They've withstood exposure of 17 days or more in 10-pct solutions of sulfuric, nitric and hydrochloric acids as well as caustic potash.

Because the vinyls have good resistance to acids, parts from the coated materials can be cadmium, zinc or chrome plated on the unprotected side after forming.

Cleaning Agents — Vinyl-coated materials, like all other materials, will require cleaning from time to time. Cleaning is not difficult, but you must know what agents to use. Most cleaning can be done with: (1) household soaps or detergents in water, (2) ammonia, (3) mineral spirits, or (4) painters' naphtha.

Stains might not be removed by any of the recommended cleaning solutions. If such is the case, wipe the vinyl surface with one of the following: methyl alcohol, ethyl alcohol, isopropyl alcohol, diacetone alcohol, trichlorethylene, perchlorethylene, or a cleaner free of carbon tetrachloride. Do not immerse parts in any of these solutions.

Avoid These—Like other substances, vinyl has it weak points. It will not resist some solutions too well and exposure to them should be avoided. These include carbon tetrachloride, benzene, lacquer solvents, ketones, chloroform, xylene and toluene.

The question of heat resistance often arises from the standpoint of end use: Vinyl-coated metals can withstand continuous exposure up to 160°F, and higher for shorter periods of time.

How Vinyl Plastisol Coating Holds Up

Stain Resistance
(Wet exposure for 48 hr at 70°F)

Did Not Stain	Stained But Easily Removed	Permanent Stain
Ink eradicator	Milk*	Butter*
Hair wave lotion	Merchurochrome	Lubricating oil*
Nail polish remover	Cough syrup	Mayonnaise*
India ink	Writing ink	Vinegar*
Window cleaner	Hair wave set	Lipstick
Gasoline	Liquid shoe polish	Mustard
Beer, wine, whiskey	Nail polish	Tincture of iodine
Lighter fluid	Multilith ink	Hectograph ink
Liquid detergent	Mimeograph ink	Stamp pad ink
Liquid and paste waxes		Ball-point pen ink
		Paste shoe polish

* Milk, butter, lubricating oil and mayonnaise did not stain after a 4-hr exposure in open air at 70°F. Vinegar stained but was removed easily.

Abrasion and Scuff Resistance

Coating on Metal	Test 1*	Test 2**	Test 3***
Vinyl Plastisol	Minor abrasion	Wear not discernible to eye	Little or no damage
Phenolic Resin Laminate	Much deterioration	Slightly dulled	Hairline damage
Baked Enamel	Completely stripped	Dulled, and chipped in many spots	Curled off metal
Linoleum	Severely abraded	Surface dulled	Positive scratches

* Resistance to shot blasting.
** Ball mill charged with hard glass-like particles and hard porcelain balls used to grind frits for porcelain enamels. Tests ran for 25 minutes.
*** Constant-load knife-edge scrape test.

Resistance of Polyester Film on Metal

Stain Resistance

Did Not Stain

Hydrochloric acid, 10 pct	Gasoline	Coffee
Sodium hydroxide, 10 pct	Beet juice	Wax crayon
Alcohol, 70 pct	Iodine	Shoe polish
Mustard	Carbon tetrachloride	Insect spray
Vinegar	Cooking Oil	Dye
Port wine	Soap	Ink
Citric acid, 10 pct	Detergent	
Lemon juice	Ammonia	

Moisture Resistance

Excellent bond and no blistering after 1000-hr exposure at 100 °F, 97-pct relative humidity.

Abrasion Resistance

(Taber Abrader with CS-17F wheel.)
No failure after 1500 cycles with 1000-g load.

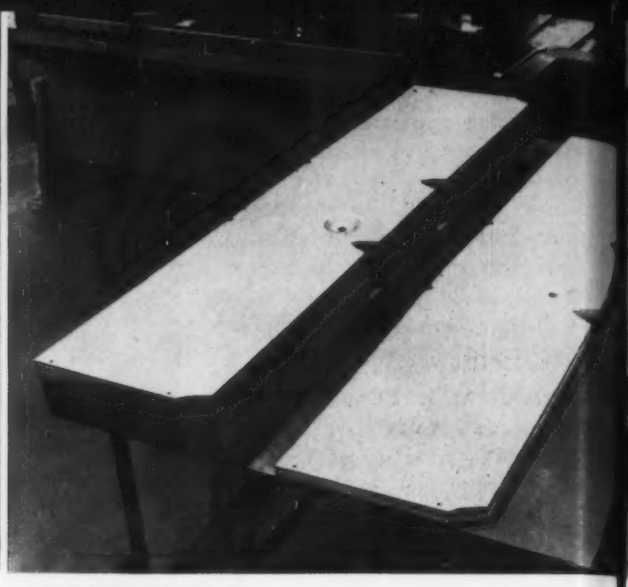
Steam Resistance

No failure after 1 hr with specimen 3 in. from steam jet.

Water Immersion

No failure after 115 hr at 77 °F.

IN TRANSIT: Vinyl surface provides own protection.



NOTCH, DRAW: Use same die as for metal alone.

How Coated Metals Affect Forming, Shaping Steps

What does it take in the way of production equipment to handle coated metals?

It's surprising to find that the units you have today will work quite well on these versatile materials without change.

■ It's often said that precoated metals can go through much the same forming and stamping operations that are commonly used with unfinished metals. Can this be taken literally, or are there some special tricks that can aid the shop in working with these materials?

For one thing, such coatings—far from causing problems—can actually aid in forming steps. In fact, not only are coated metals available as flat sheets, they're also turned out in coil form. They can be fed right into drawing, forming, and bending steps with standard equipment.

Check Vinyl Laminates—Vinyl-metal laminates can be formed and fabricated without costly retooling or special, complex techniques. The vinyl surface actually seems to improve drawing and forming action.

It becomes a lubricant to permit better flow of metal. The coating often eliminates the tearing and wrinkling of complex draws that occur in unfinished metal.

These laminates are supplied as convenient flat sheets ready for fabrication. Their natural abrasion resistance minimizes handling damage.

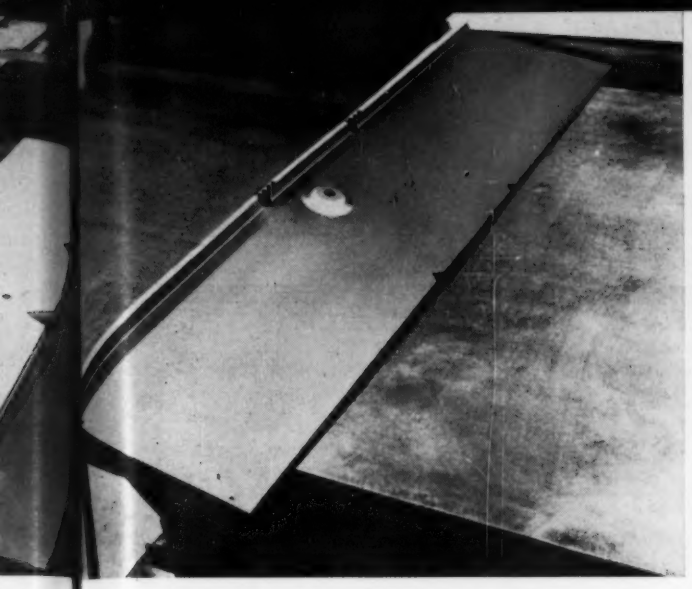
Use Existing Dies — All that's needed to adapt existing dies is to reduce the gage of base metal to compensate for the thickness of the vinyl. Usually one gage reduction is enough because the vinyl compresses up to 50 pct during forming.

Despite temporary compression, the inherent memory of the vinyl causes it to retain any texturing.

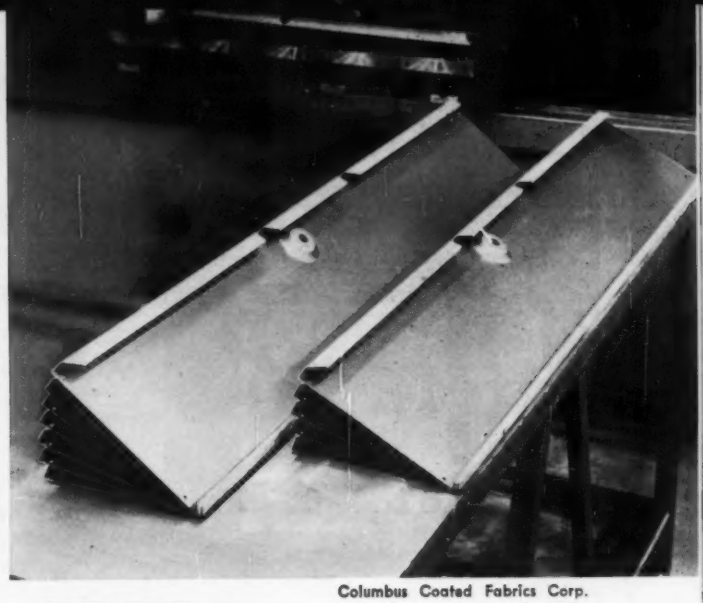
While any standard, lightweight die lubricant may be used in forming or drawing the vinyl laminate, water-soluble or silicone-base lubricants are recommended. Another good lubrication approach is the use of slip sheets of heavily waxed paper.

Degreasing Hints—For removing heavy grease, use white gasoline or a mild detergent. It's important to note that trichlorethylene vapor degreasers or chlorinated solvents will adversely affect the vinyl-to-metal bond.

Using standard combination roll formers, vinyl-metal laminates can be processed in many ways without vinyl rupture or delamination. This includes Pittsburgh locks, 90° or 180° crimp bends, double ogee or crimp rolls.



TAKES BEND: There's no distortion of finish at bends.



Columbus Coated Fabrics Corp.

TURN EDGE: Exposed metal edge is turned under.

While the material will also withstand normal cutting operations, where possible, the vinyl side of the laminate should be exposed to the cutting edge. Where there are laminations on both sides, the thinner gage vinyl should be exposed.

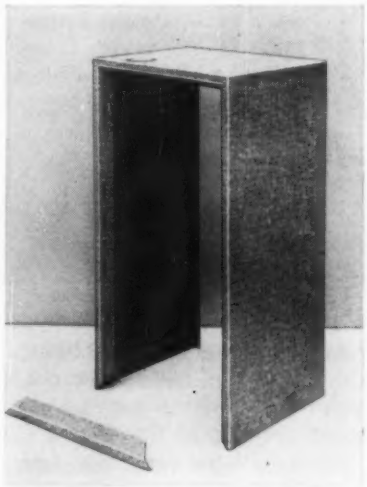
Deep Draw Too — Deep draws are also quite feasible with the laminate. As far as deep draw limitations go, you should avoid an extremely deep cigar-shaped draw, which is rarely encountered anyway.

Another general restriction is that some extremely tough materials, such as tough alloys, require high heats to deep draw. Such alloys should not be used as the base metal in laminates if deep draws are contemplated, since the plastic facing can be damaged by such high heats.

A frequently asked question is how to reclaim rejects. The answer is that there are surprisingly few rejects when using the laminate.

It's probably due to the lubricating effect of the laminate. It's better to forget reclaiming and throw your rejects away.

Vinyl Plastisol Steps—For sheet steel coated with vinyl plastisol, much the same techniques apply as for the vinyl-metal laminates. The materials can be slit, punched, lock seamed, drawn or roll formed in the same manner as cold rolled sheet without damage to the vinyl coating or change of color.



READY FOR ASSEMBLY: Without further finishing steps, cabinet casing is ready for assembly.

U. S. Rubber Co.

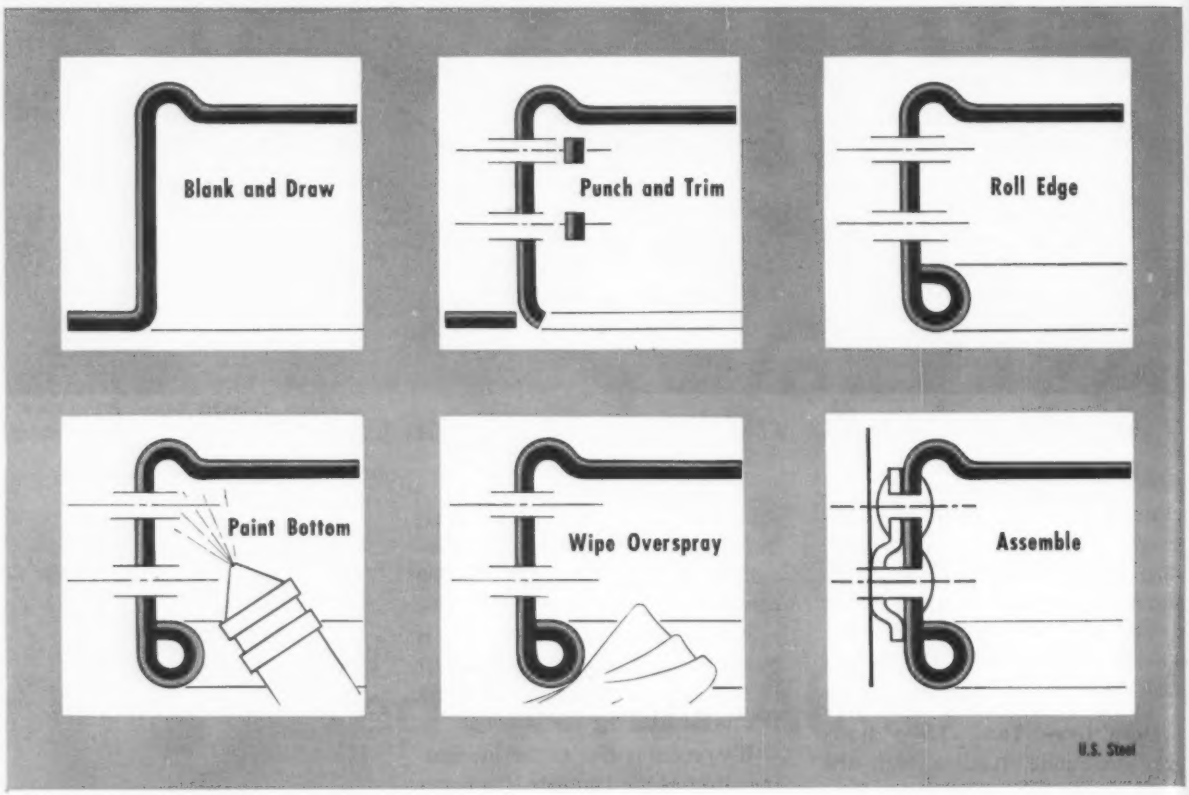
WITHSTANDS BEND: Operator forms vinyl-metal laminate in break press. It's one of many steps that can be done without damage to vinyl.

Drawing quality, special-killed vinyl coated steel readily withstands elongations of 30 pct. Proper die settings and clean dies are most important to successful die forming.

Small bits of metal or paint remaining in the dies from previous operations will scuff vinyl surfaces under severe die pressures. Die clearances should be set for the ordered thickness of the steel plus 60 pct of the vinyl coating thickness.

Figure Die Clearance—Take, for

Coated Metals Simplify Production



example, a 0.030-in. steel coated with a 0.010-in. buffalo-hide finish vinyl. The required die clearance would be 0.036 in.

As with vinyl-metal laminates, water-soluble lubricants are recommended because they may be easily removed with hot water or detergents. There's also the same caution to be noted in using vapor degreasing equipment. High-temperature units tend to soften the vinyl or loosen the bond.

How Polyesters Act — Another coated metal has a polyester plastic coating. The coating process can include a method for applying any decorative pattern that can be photographed.

Unlike the vinyl coatings, the polyester thermosetting plastic is a hard coating without memory. But here again despite being predecorated, it can be subjected to the same forming operations as uncoated steel.

This material is now available in coil form in widths up to 32 in. as well as in flat sheets. It'll soon be available in widths up to 48 in.

Pre-Enameled Strip — Another coated material is pre-enameled steel strip which also comes in coil form.

Before application of the baked enamel finish coat, the strip is electrolytically zinc coated and then treated with phosphate. Again, it's suitable for forming, stamping or drawing into finished products without further finishing.

The enamel finish will not crack or peel during these steps. Unpainted edges are protected by the creeping galvanic action of the zinc coating.

For Finished Product—As an example of how a manufacturer can benefit from use of a coated metal, take the case of portable movie screen casings. Sheet steel is ordered cut and precoated.

In process, the piece is formed and beaded. Steel brushing is done in the center to permit spot welding of the case bracket.

The rounding and beading operations are done at the rate of 250 per hour. With no further finishing necessary over-all production is speeded.

Ready-Made Application — The production steps in the line drawings above point up how vinyl coated steel sheet is processed in making folding chair seats.

Vinyl coated 20-gage steel is used. It's blanked and drawn on the same production dies used for cold rolled steel sheet.

Ten holes are punched and the seat edges trimmed. The trim die also begins the edge roll.

A single die stroke completely rolls the edge to 0.025-in. diam.

The seat sides act as a mask in spraying finish color coat on the seat bottom. A wiper dipped in solvent takes care of the overspray on the vinyl face.

Use Normal Joining Methods To Assemble Coated Metals

Plastic-coated metals can be joined like any unfinished steel part.

However, there are certain limitations that must be included in your planning.

How about assembling these precoated metals? Will the very nature of the plastic coatings preclude normal assembling techniques?

Actually, plastic-coated metals are very versatile. Piece parts can be assembled much like any unfinished sheet metal part. No costly retooling or complicated, special techniques are required. But the few limitations that do exist should be considered with initial planning.

Mechanical fasteners are as practical with plastic-coated metals as with unfinished sheet metal parts. The same considerations apply to the selection of fasteners and the production method.

Prefer Coated Side — However, piercing or blanking is most suitable from the coated side. Where both sides of the piece are coated, the side with the thicker coating should be exposed to the cutting tool.

Mechanical interlocking by bending, crimping, or any standard lock seam technique is practical.

Crimping operations can be performed on a standard forming machine. The use of coated metal instead of unfinished metal requires no additional set-up time for tooling changes.

With the vinyl-coated metals, the resilient vinyl offers unusual opportunities for fastening with extruded metal devices. You can combine decorative appeal and functional needs with simple assembly procedures. Extruded teeth within the gripping channels will satisfy most structural requirements.

Lock Process — One manufacturer features a special lock process, for example, in assembling items like a projector case. Extrusions are joined to the flat wrap-around blank, then folded together to the finished shape.

The end panels are inserted into the extrusion channel. A clinching operation simultaneously closes the extrusion teeth on the vinyl laminate, and dimples the extrusion into pre-notched holes in the end panels.

Large sheet panels are formed so that installation can be started from either side of the work area at the trim strip or corner molding. The edges interlock and are fastened to framing through a covered flange so nothing is exposed on the finished surface except the vinyl face.

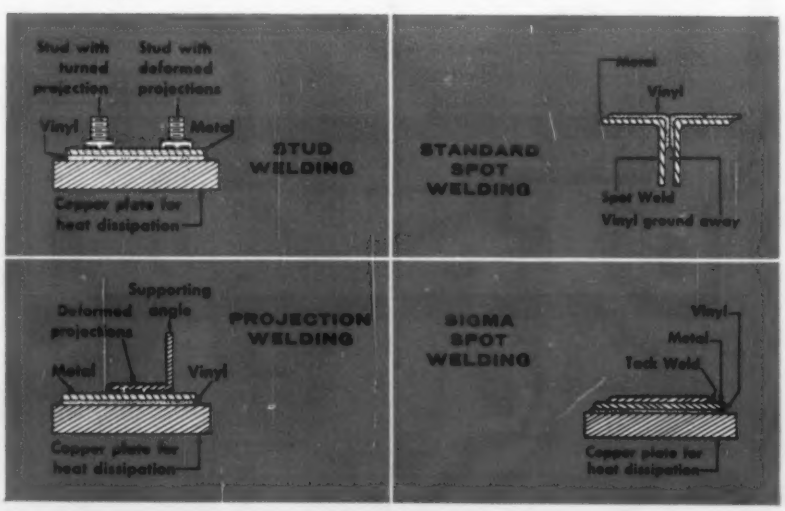
Joints fit snugly, forming a neat V-groove and have adequate overlap to allow for minor irregularities in the basic wall. Corner-shaped moldings and trim strips (end caps) of matching vinyl provide a continuous and uniform surface treatment.

Try Furring Strips—To assure level installation over studs or rough masonry walls, horizontal furring strips are recommended. Where studding, the same width of the vinyl-metal sheet has been accurately erected, the panels can be installed directly.

What about adhesive bonding? How well will this joining method work with vinyl-metal laminates?

Sheets can be applied to any

Ways To Weld Coated Metals



reasonably even and firm backing wall by the use of adhesives. The sheets should be cut, trimmed, and fitted to the required size and shape before the adhesive is applied.

A special rubber-base mastic should be spread with a grooved trowel over the entire area to be covered. To apply the sheets, it is important that they be thoroughly rolled with a hand roller. This pressure assures that adherence to the wall is uniform and complete.

Watch the Temperature—When using adhesives that require heat for curing, the heat limitations of the plastic coated metal must be considered.

One vinyl-metal laminate with an embossed vinyl surface will withstand temperatures approaching 250°F without loss of embossed texture. Where pressure is required in addition to heat, the limit goes down proportionately.

This same laminate with a smooth vinyl surface will accept about 30 pct higher heat.

Such other adhesives, as the contact or mastic types, present no special problems. When using adhesives that require time for curing, clamps can often be eliminated by using interlocking, design, or resistance tack welding.

Generally, vinyl-metal laminates in the flat are more tolerant to heat than formed or deep-drawn shapes. However, because of the many variables, each bonding application should be considered on an individual basis.

How About Welding?—An obvious joining method is welding. But the heat limitations of vinyl-coated sheet makes some forms of welding impractical—particularly where the weld area is an exposed finish surface.

Only those welding methods that sharply localize and limit the spread of heat are successful. The heat factors, combined with the electrical resistance of vinyl, limit the use of resistance welding procedures.

However, resistance-type stud welding is practical, and conventional spot welding can be used on the finish side by removing the vinyl surface by wire brushing or stripping.

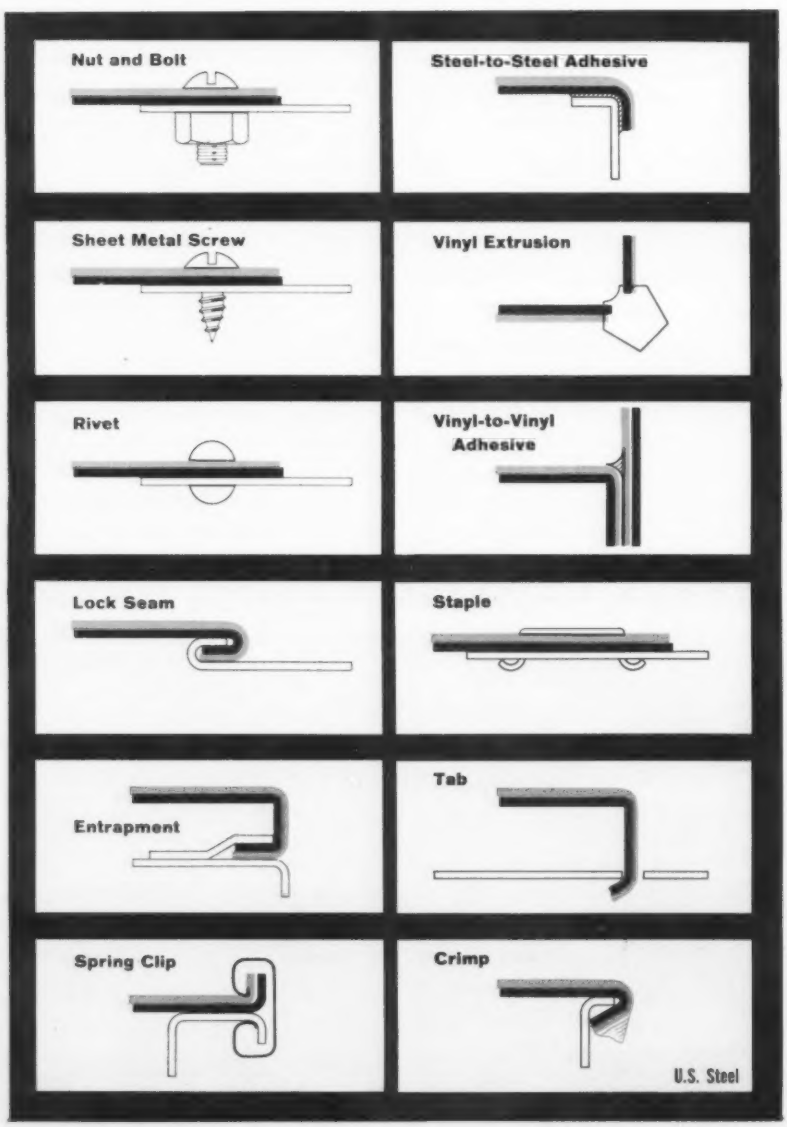
Where the weld surface is opposite a vinyl surface that will be exposed, resistance welding equipment must be tooled for indirect series or parallel techniques (both electrodes on metal under-surface).

Limits the Size — In projection welding, all projections must "set down" at once. This limits the size of one of the piece parts to be joined. The projection welding equipment must be capable of: very short weld times and extremely fast follow-up of forging pressures.

Magnetic-force projection welding is done by series welding and indirect welding. One side of the circuit is carried into the back side of the vinyl-coated steel while the other electrode is in direct contact with the uncoated sheet on the side opposite the projection.

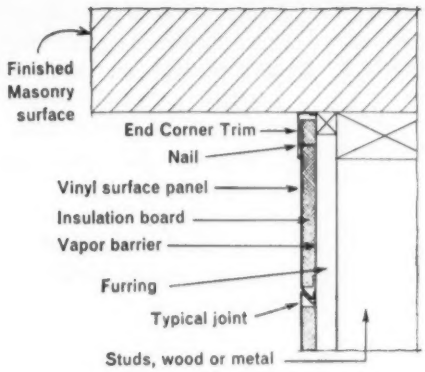
An advantage of magnetic force is that the force is present when the

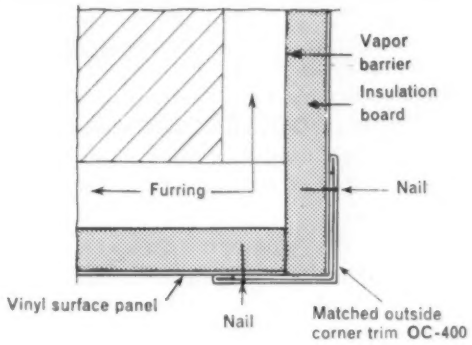
Use These Fastening Methods

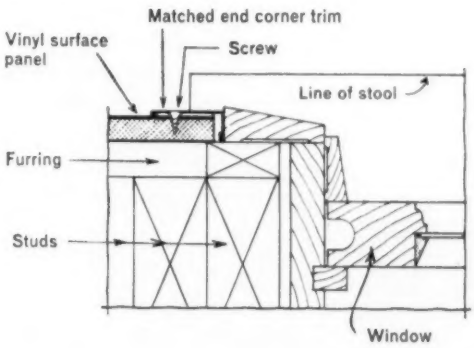


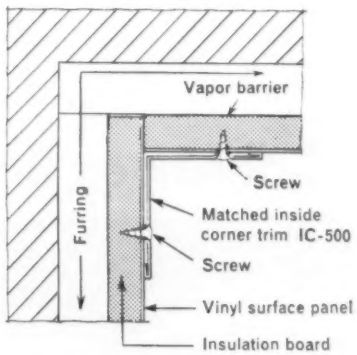
Arvin Industries, Inc.

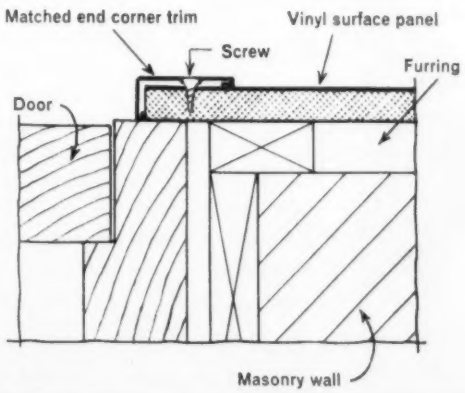
Helpful Tips on Installing Panels

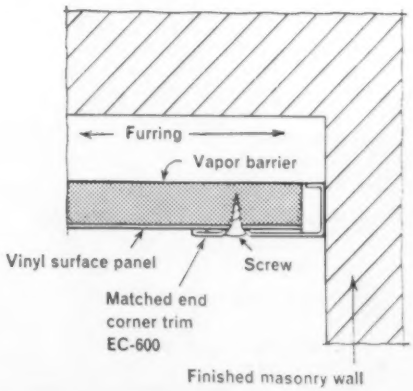


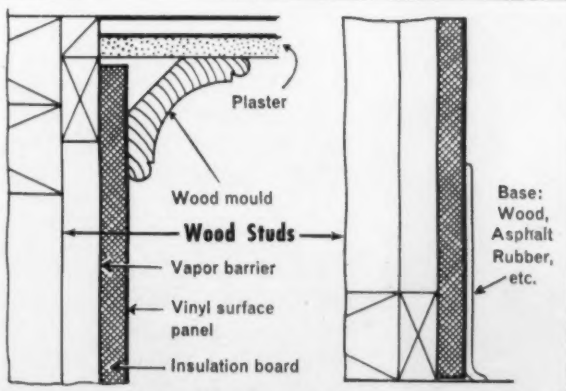


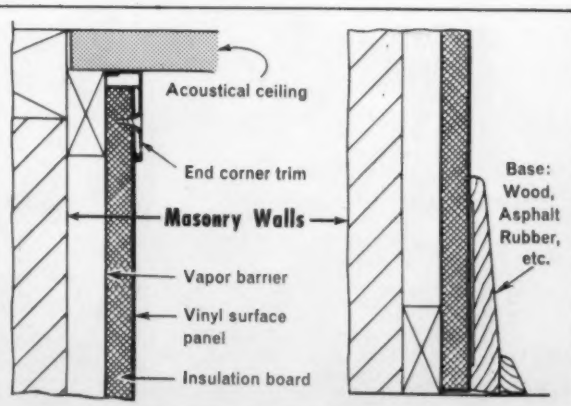












current is flowing and can be timed accurately. Also, the impact blow of the magnetic force brings the parts together during the short welding time.

Use For All Types—This method of welding is suitable for all types of vinyls, such as laminated sheet in addition to paste coated or liquid vinyl applied over a compounded adhesive.

Critical factors, however, are vinyl thickness, sheet thickness, combination of materials to be welded and part geometry.

Welds of good shear strength are consistently obtained. But there must be good quality control of the parts involved. The projection shape and height are important. The fit of parts being assembled must be good enough to insure against current leakage. The power supply to the welding machine should be good, with voltage variation at a minimum.

Can Weld Assemblies — Welds have been made using galvanized sheets assembled to vinyl-coated sheets. Projections may be put in the vinyl-coated sheets with the vinyl brushed off the projection to permit welding of an uncoated sheet. Also, the pressure can be applied to the projection through the vinyl coating with current applied away from the weld.

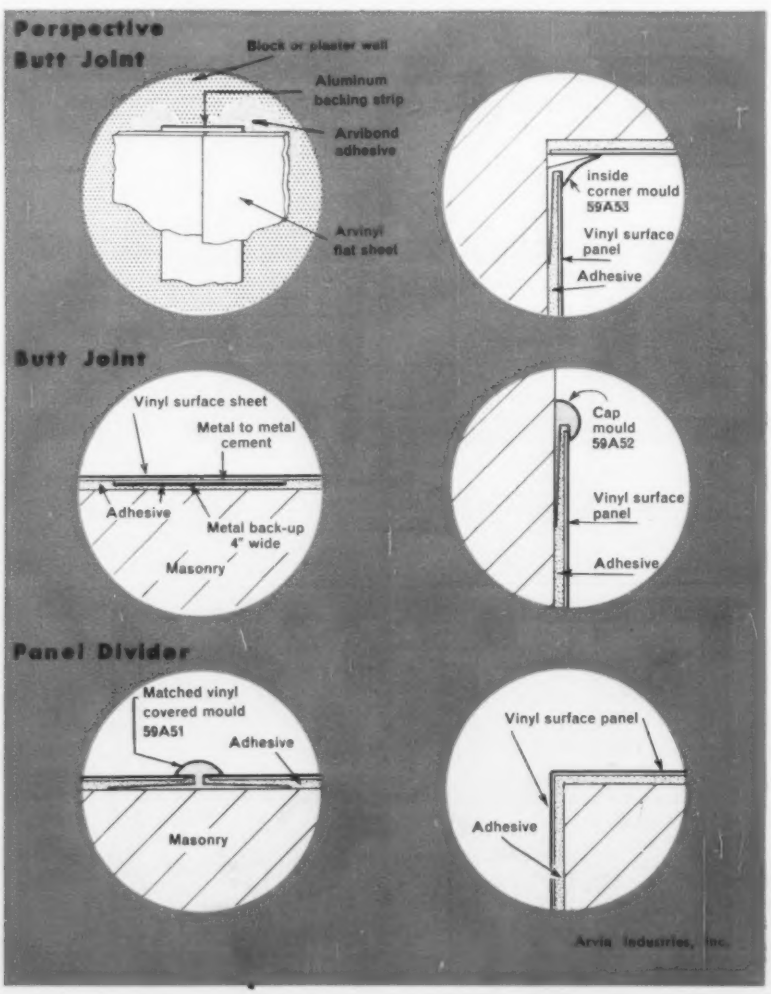
Recently, modified conventional welding machines have been used successfully. For example, a single-phase, ac welding unit equipped for indirect projection welding can be used to hold uncoated steel sheets to the uncoated sides of vinyl-coated steel sheets. The important provision is that the equipment have standard electronic controls modified for "half-cycle welding."

Modified electronic controls permit the passage of only ½-cycle of alternating current. This is in contrast with standard controls which have a minimum timing limit in the range of 1 to 3 full cycles.

Stud welding can be accomplished in very much the same manner as standard resistance welding. The studs may have either turned or deformed projections.

In virtually any form of welding where only the sheet thicknesses of the material are involved, a copper plate should be used for rapid heat dissipation.

How Adhesives Bond Panels



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Acme-Newport Steel

LEAVES ITS OLD KENTUCKY HOME

Destination: SPACE!

Carefully processed from electric furnace to finished steel, Acme-Newport products take off by fast truck or air freight on their second move toward space. Next stop: prime and subcontractors who continuously employ the long experience, skills and modern facilities of Acme-Newport in the cause of national survival. Alloy and carbon grades in strip, sheet and coil, become components of rockets, missiles, planes and ground support equipment, which permit nothing but perfect performance. Through three-quarters of a century we have supplied quality steel for arms and industry . . . for both of which we ask you to make our facilities your own.

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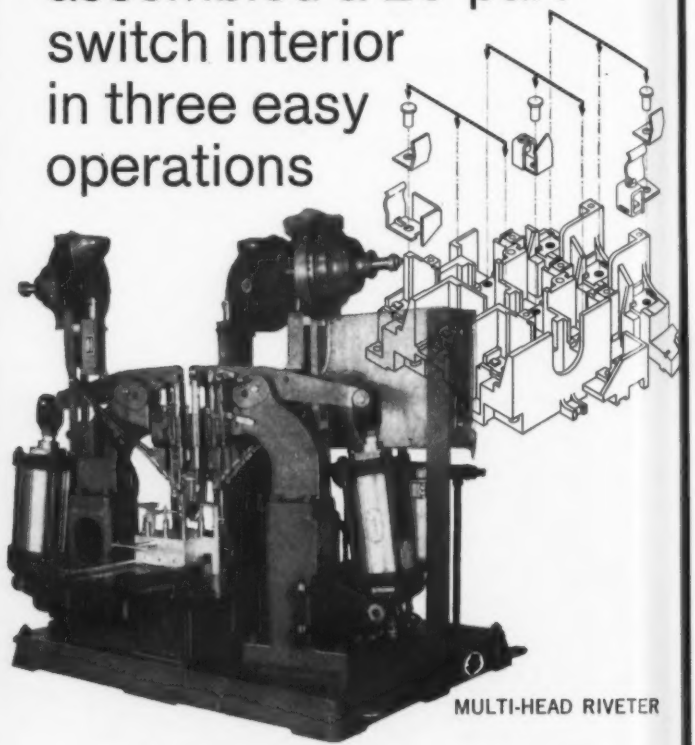
Acme-Newport mills; Cincinnati in background

BOTH MADE ASSEMBLY MORE AUTOMATIC

with the help of **TRS PAR PROCESS** riveting engineers

GENERAL ELECTRIC

assembled a 25-part switch interior in three easy operations



MULTI-HEAD RIVETER

Assembling interior components of the new G.E. Safety Switch required nine riveting operations, fastening twenty-four components to a complex molded base. Engineers from G.E. and TRS worked together in planning the assembly steps and in designing this Multi-Head Riveter to accomplish them. All components are loaded on a TRS-designed fixture which is equipped with a cam-operated hold-down and a 3-position stop mechanism. Sliding the loaded fixture forward to the first stop, the riveter is tripped to set three rivets at one time. At the second and third stops, two more groups of three rivets are set to complete the assembly. Withdrawing the fixture causes the hold-down to open, permitting removal of the work.

TRS

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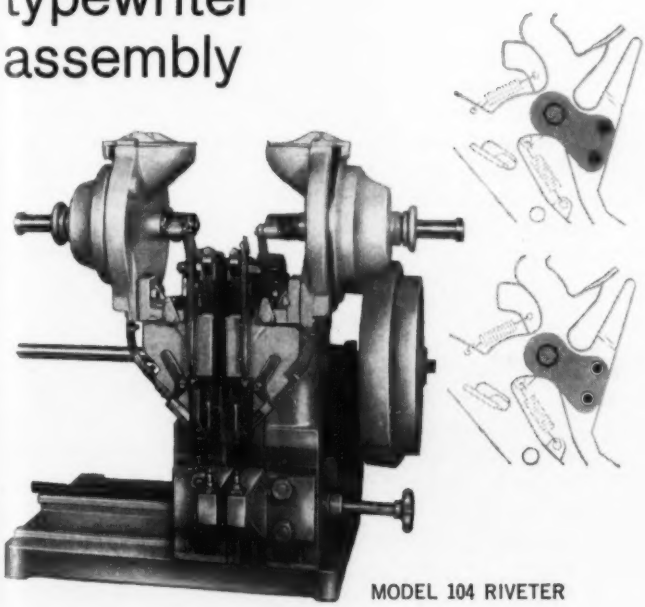
ROYAL McBEE saved almost $20,000 in their Royal Electric typewriter assembly



MODEL 104 RIVETER

Original production plans called for the use of solid rivets and a spinning machine, to put together a subassembly for the Royal Electric typewriter. Countersunk holes were required. Also, transferring the loose assembly to the fastening position offered many opportunities for scrap-making fumbles. The TRS engineer suggested replacing the solid rivets with semi-tubular rivets, not requiring countersunk holes, and automatically fed and set with standard TRS Model 104 riveters. A special loading fixture was designed by TRS, to receive the components and remove any chance of fumbles. Within a relatively short period of time, almost $20,000 was saved through a marked increase in production efficiency plus the virtual elimination of rejects.

FIND OUT what TRS PAR PROCESS can save you!

PAR stands for **P**roduction **A**utomated **R**iveting. It is the process through which TRS applies Automation to assembly by integrating and making more automatic operations like:—

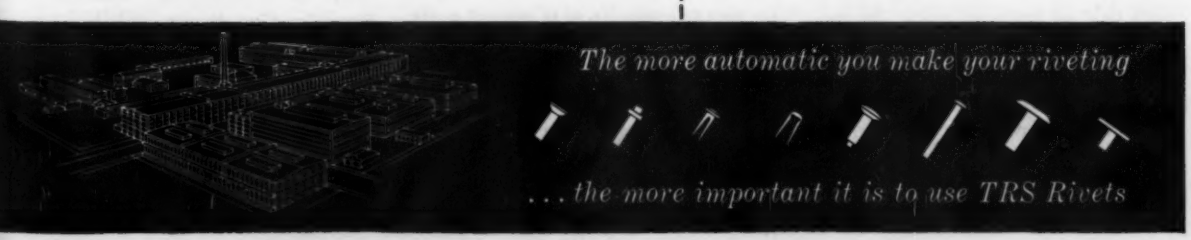
1. FEEDING of tubular rivets or related products.
2. TRANSFER of parts to — or between — riveter stations.
3. SEQUENCING from 3 to 15 rivet setters to operate simultaneously or in any desired order.
4. CONTROL of setting force as required by parts thickness or material characteristics.
5. SENSING of improper conditions and stopping equipment to avoid injury to parts, equipment, or operator.
6. EJECTION of parts as required.

To design the integrated system of standard or multi-head riveters, feeders, transfers and controls required by the TRS PAR Process demands the special knowledge and experience which TRS possesses in greatest measure.

TRS not only originated tubular rivets, but also the revolutionary multi-head riveter which opened up new possibilities for automating the riveting process.

Invite a **TRS** Engineer to Check Your Assembly Operations

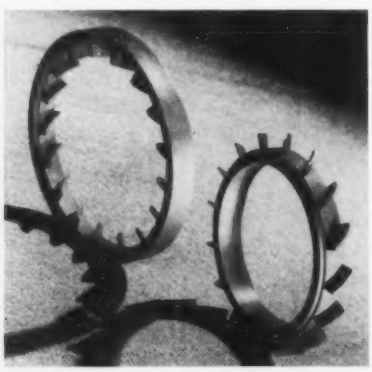
If your product can be riveted, and especially if several rivets are involved, it's practically certain that TRS can help you increase production rates, save on direct labor charges, decrease parts spoilage and machine down time. To investigate, just write or phone the nearest TRS office.



Among the Metal Show Exhibits

Precision Castings

On display will be certain interesting examples of castings produced by the patented Shaw Process. This process produces a precision investment casting similar in accuracy and finish to a "lost wax" casting, but up to ½ ton and larger in size. The process uses low-cost



patterns and equipment, and simple refractory molds. This economical process can handle all castable metals. The method, already employed by a number of manufacturers, is available for license. (Shaw Process Development Corp., Booth 1463)

For more data circle No. 50 on postcard, p. 283

Carbon Brick

A new carbon brick for blast-furnace linings and aluminum-cell applications is up to 100 times less permeable than conventionally produced anthracite carbon brick. It has a thermal conductivity seven times that of ceramic brick. In the same company's display will be electric furnace electrodes used in producing steel ingots, steel castings, ductile iron, pig iron, ferroalloy, and carbides. Also shown will be graphite fluxing tubes for degassing, graphite powers for injection, thermocouple parts, crucibles and molds, graphite dies for casting, cores and chills, and graphite reference forms used in furnace-brazing stainless-steel honeycomb assemblies. Impervious graphite equipment for handling corrosive solutions will be exhibited. Spectroscopic electrodes and powders, motor and generator brushes, and welding electrodes and plates will complete the exhibit. (National Carbon Co., Booth 527)

For more data circle No. 51 on postcard, p. 283

Chilling Equipment

One display consists of two models of ultra-low-temperature equipment for industrial uses. This equipment is designed to serve a wide range of uses in heat-treat shops, in the manufacture of tools, gages, and other alloy-steel parts, as well as normalizing of aluminum and magnesium castings. One model, with a chamber 30 x 18 x 16 in., has a temperature range of —70° to —130°F. With the chamber prechilled, 15 lb of steel parts can be chilled per hour from 70° to —120°F. The other has capacity for full production-line operations. It provides a thermal capacity of 1200 Btu per hour at —120°F, and will chill 60 lb of steel per hour from 70° to —120°F. Chamber size is 30 x 31 x 44 in. Temperature range is —70° to —140°F. (Cincinnati Sub - Zero Products, Booth 1756)

For more data circle No. 52 on postcard, p. 283

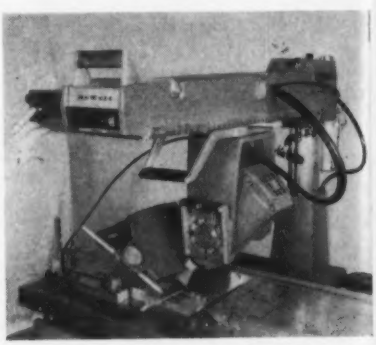
Tensile Testers

Two completely new tensile-testing machines will be exhibited. One is a bench-mounted model, and the other is portable. Both have several accessory sizes and styles of specimen-holding jaws, so they cover a wide range of flat and cylindrical specimens. Maximum capacities range from 1000 to 40,000 lb. Also displayed will be a dial indicator and optical-type proving rings for measuring loads with high accuracy, a ductility tester, and various types of Brinell hardness testing machines. (Steel City Testing Machines, Inc., Booth 1727)

For more data circle No. 53 on postcard, p. 283

High-Speed Saw

A radial-arm machine performs high-speed cutting and machining of nonferrous metals, and produces a mirror finish. It enables cutting of sections at any angle, even to slot or slit at desired points. Automatic power features make opera-



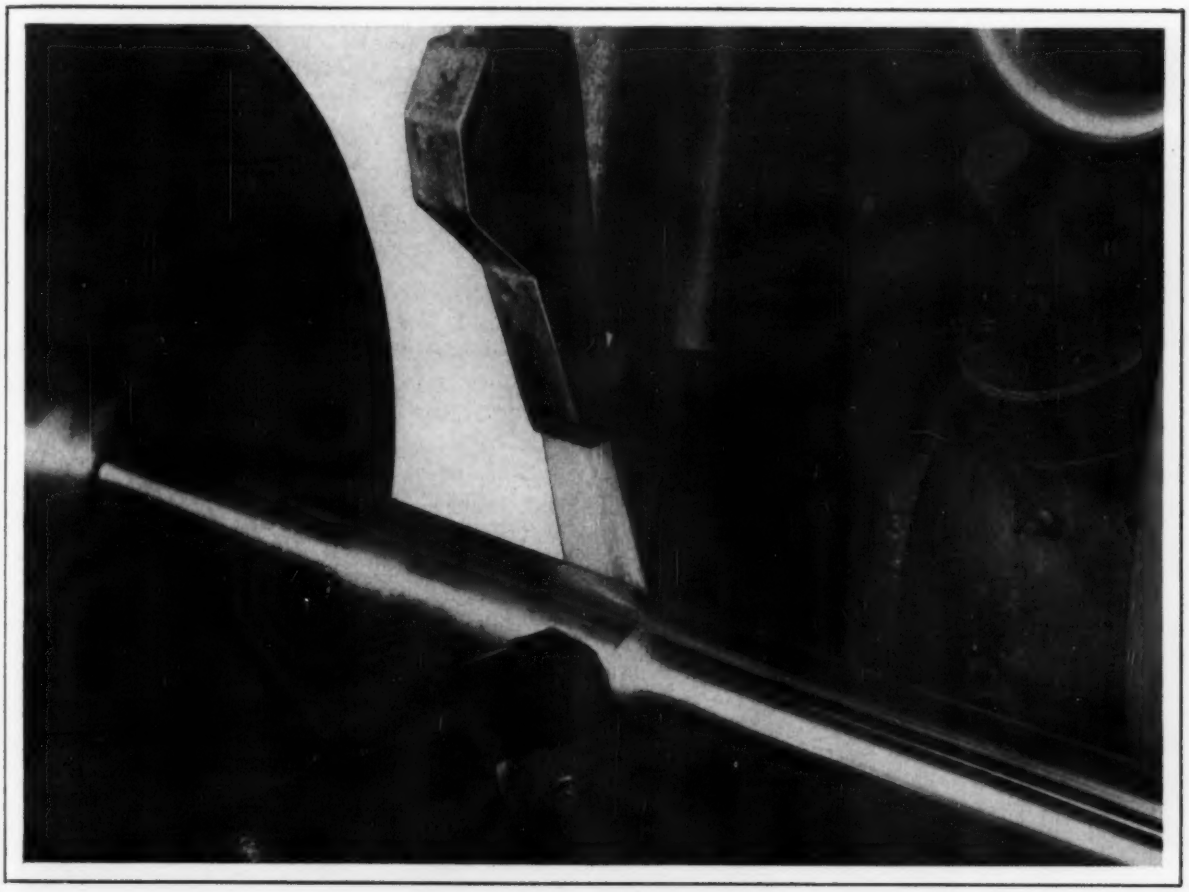
tion more efficient and safe. It is equipped with a carbide-tipped saw blade, a precision air-hydraulic feed mechanism, and an automatically integrated mist-coolant system. (DeWalt Div., American Machine & Foundry Co., Booth 1846)

For more data circle No. 54 on postcard, p. 283

Marking Machines

Various marking machines will be in one company's display. One, designed as a completely self-con-

US RUBBER GRINDING WHEELS



"U.S." Grinding Wheels installed on Naxos-Union roll grinder.

"We're standardizing on 'U.S.' GRINDING WHEELS"

—Mr. Alex Munroe, Revere Copper & Brass, Inc.

After Alex Munroe of Revere's Baltimore plant installed "U.S." Grinding Wheels on their Naxos-Union roll grinders (for reconditioning rolls on their Sendzimir 51" rolling mill) several things were immediately apparent. Chatter was eliminated and stock removal was clean and efficient. Grinding time was cut approximately 30% while producing a regular finish.

That's why Revere is standardizing on "U.S." Grinding Wheels, not only on roll grinders but for reconditioning large back-up rolls. In fact, wherever "U.S." Wheels are used, performance reports have been excellent.

If you, as a manufacturer, want to reduce grinding wheel costs and increase production, "U.S." has what it takes. For "U.S." Wheels consistently outperform and reduce costs in case after case. Get in touch with your "U.S." Representative today or write or call the address below.

US RUBBER Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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tained "in-line" marking station, is conveyor fed and discharged, and is used for marking gear carriers. A hydraulic shuttle feed positions parts in retractable cradle nests for marking. A hydraulic die slide rolls the legend into the periphery of metal parts. Each successive number is indexed automatically on the return stroke of the die slide. The entire cycle is automatic, and hydraulic operation insures smooth and consistent marking. Another, pneumatically operated, uses a stacker and shuttle feed, and marks parts and discharges them into a tote box. It is specifically designed for marking steel parts or nameplates. Of compact bench size, it marks from 3000 to 3600 pieces per hour. It insures uniform marking on parts with slight thickness variations, without changing pressure setting. (Geo. T. Schmidt, Inc., Booth 1330)

For more data circle No. 55 on postcard, p. 283

Ultrasonic Pickling

One company will feature new ultrasonic devices and a new method for pickling steel bar stock ultrasonically. Ultrasonic pickling offers an advantage over the batch-dip method now used: uniformly clean stock in less time. A working model ultrasonic pickling tank will be in operation, and samples of ultrasonically treated stock will be distributed at the booth. The ultrasonic devices to be demonstrated include a pulse-echo flaw detector, thickness testers, an ultrasonic degreaser, and an untrasonic cleanliness tester. (Branson Ultrasonic Corp., Booth 1645)

For more data circle No. 56 on postcard, p. 283

Metallograph

A new remote-control metallograph will be featured in a display of optical equipment. Designed especially for microscopic study and photographing of radioactive materials, it includes a control panel for complete remote operation, which has been built into a special shielding shell and mounting base that accepts whatever shielding material is desired. It is built around the company's standard Research Metallograph with calcite vertical illuminator. Also shown will be a portable scratch-depth gage for measuring depths and widths of scratches to 0.001 in. Other items in the exhibit will be another metallograph, a bench comparator, a new line of stereomicroscopes, and a complete selection of industrial and metallurgical microscopes. (Bausch & Lomb Optical Co., Booth 219)

For more data circle No. 57 on postcard, p. 283

Hardening Furnace

Demonstration tool hardening will be performed during the Show. One of a line of HSS hardening furnaces will be in operation. Visitors are invited to bring samples of their HSS tools for free demonstration hardening. The equipment which will be on display is suitable for production hardening or general-purpose heat-treating applications requiring temperatures from 300° to 2500°F. An outstanding feature of this equipment is an atmosphere which protects all types of high-speed, high-carbon, high-chrome, and air-hardening steels from scale or decarburization. (The Sentry Co., Booth 1719)

For more data circle No. 58 on postcard, p. 283

Products, Services

One company's booth will contain products and services of its three divisions. One section will be a display of parts treated by the patented Chromallizing process, a process for diffusing chromium and other metals into the surface of iron, steel, superalloy, and refractory metals. The process produces a heat-, wear-, and corrosion-resistant case on such parts. Also on display will be samples of Iochrome, a super-pure chromium containing no impurity in quantities greater than 10 parts per million. More of this chromium can be added to superalloys than less pure chromium, resulting in greater high-temperature strength and oxidation-resistance. Gray-iron castings produced by another division of the company will be displayed. Lastly, an explosive forming technique will be demonstrated, as well as the products of a division of the company making aircraft and rocket components. (Chromalloy Corp., Booth 1615)

For more data circle No. 59 on postcard, p. 283

Program Controller

A new Master-Slave Program Control System will be unveiled at the Metal Show. It is designed for applications where temperature uniformity is of prime importance. It is already being used successfully in brazing stainless-steel honeycomb panels for supersonic aircraft and missiles, where fabricating requires close control over every product phase, and actual brazing temperatures must be held within ±5° to 10°F during the brazing cycle. Visitors will have an opportunity to simulate a program with the system on display. It will consist of three recorder-controllers with appropriate thermocouples and control devices for each of three zones; a Master-Slave Program Control unit with its associated Master Drive Unit for automatically and continuously adjusting control point setting for each zone; and a switching panel for selecting any one zone as the master. The system has the flexibility to take a product through various heating and cooling rates and hold points with minimum temperature gradient. As many as 24 zones can be automatically controlled by one Master-Slave Programmer. The system is available with three-action control for gas-fired furnaces or with three-action control for continuous, stepless reg-

WE DARE YOU TO TRY THIS

. . . with anything but a Clearing-Axelson Blue Chip Lathe

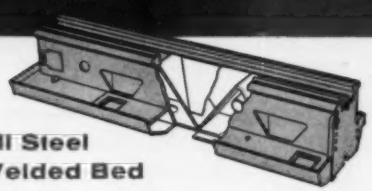
A spine smashing test—Yet we got precision results on this ¾″ cut under conditions that would make any other lathe sway-backed.

Why bother to run a lathe suspended in air? Only to demonstrate the incomparable rigidity of the welded steel Clearing-Axelson Blue Chip lathe. This rigidity is absolutely permanent; it will maintain the precision of this machine through years of the most severe service.

And why, you may ask, is such enormous rigidity important?

Well, a lathe that can whistle its way through the toughest alloys yet provide vibration free operation has to be rugged. The Blue Chip lathe turns out more accurate work, faster—even when hogging off metal at a clip you would have thought impossible up to now. More horsepower permits use of latest tools—smooth, effortless operation saves you money on tooling.

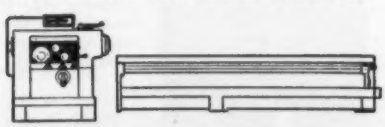
Clearing also manufactures the Clearing-Harrison lathe, presses of all types, dies and special tooling, and special equipment for the aircraft and missiles industry.



All Steel Welded Bed

Stronger steel plate provides strength where it is needed. Pyramid shaped reinforcing ribs are used the entire length of the bed for high torsional rigidity.

Modular Bed Construction



Headstock and bed on Blue Chip Lathes are built as separate units. Both are all steel weldments, fully stress relieved, and both are built-to-the-floor. That's how the Blue Chip lathe can laugh at obsolescence. Need a larger bed? Order a new bed but keep your existing headstock.

All the facts on the Blue Chip line of lathes are in this catalog. Write for your copy today.

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GRANODINE 663

FIRST AUTOMATED IRON PHOSPHATE PROCESS!

and it's "cold," too!

NEWEST PRE-PAINT TREATMENT FOR STEEL

AUTOMATED GRANODINE 663—the industry's first—takes the human element out of quality control . . . replaces it with 100 percent electronic line control, every hour of every day! You get positive, electronic vigilance on the line that adds up to savings in time, labor and chemicals—yet overall coating uniformity and quality never varies!

COLD GRANODINE 663—the coldest yet—means on-the-line savings of 50 percent or more in heating dollars! Typical heat savings range from up to $12,000.00 per year on large volume lines, to $7,500.00 and $5,000.00 yearly on intermediate and smaller spray lines when compared to the cost of typical hot processes.

Put your phosphate processing on a more productive basis with the first completely automated phosphating line in the metalworking industry. Write, wire or phone your local AMCHEM representative for further information on cost-saving, time-saving Granodine 663!

Write for Bulletin 1698 on Granodine 663—contains eye-opening quality control data that will interest your company's financial experts!

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Automated

GRANODINE

another chemical development of

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Check these Automated GRANODINE 663 Features...

- ✓ Automated—for round-the-clock quality and bath stability!
- ✓ Cold—for substantial heat savings!
- ✓ Lowest coating weight consistent with top quality!
- ✓ Powder-free coatings, continuous and adherent!
- ✓ Sludge-free bath!
- ✓ No oxidizing accelerators required!
- ✓ Readily soluble powder form, cheaper to ship, easier to store!

...and call your Amchem representative today!

AMCHEM

Automated GRANODINE

another chemical development of
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ulation of input to electric heaters or blankets. Also on display will be a new accelerated cooling device recently added to the manufacturer's steam furnace line. Designed primarily for atmosphere tempering and stress-relieving of both ferrous and nonferrous parts, it permits work to be furnace-cooled in minimum time under atmosphere protection. It will make bright tempering or stress-relieving not only feasible but also economically obtainable for the first time on a production basis. (Leeds & Northrup Co., Booth 836)

For more data circle No. 60 on postcard, p. 283

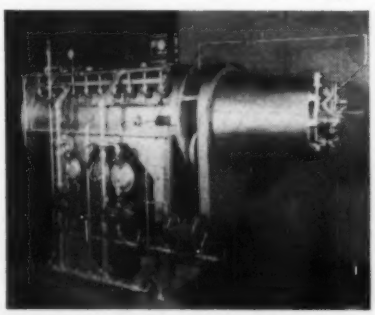
Metalcutting Line

In a package deal, one company will present the largest number of new developments that it has ever announced at one time. Included will be a new power saw, a line of stainless-steel gage blocks, a completely new line of electronic inspection instruments, a new small precision surface grinder, and two redesigned lines of band machines. The latter will include one machine specifically developed for the modern tool-and-die shop and another machine for high-speed production band machining. The new power saw is a fully automatic cutoff machine with 20 new features for fast, convenient operation. It provides a job-selector dial to aid selection of speeds and feeds for different materials. The display of stainless-steel gage blocks will show how the well known desirable properties of stainless steel, when applied to gage blocks, result in a longer life of dependable gaging accuracy. They are interchangeable with regular steel gage blocks, and have the same coefficient of temperature expansion. There are two parts in the section of electronic inspection instruments. One consists of a group of interchangeable gaging components for fast, accurate inspection under shop conditions. They are self-contained, transistorized instruments. One, of particular interest to users of surface plates, provides a fast, easy-to-use method for determining surface-plate flatness. The other part is a series of comparators combining absolute dependability with very accurate calibration and inspection. They are calibrated in millionths of an inch. The new small precision surface grinder is available as a manual or hydraulic model. It uses the same heavy-duty, 1-hp spindle that larger models in the line have. The band machines have been redesigned to include a number of new features. Representative machines on exhibition will show how these features extend the cost-saving benefits of band machining for both toolroom and production uses. (The DoALL Co., Booth 620)

For more data circle No. 61 on postcard, p. 283

Automatic Furnace

The latest model in a line of automatic continuous furnaces will be on display. It is a rotary retort furnace with a new style automatic feeding hopper. Work is conveyed through the retort by an integral internal spiral. Work is discharged



from the retort in the heating chamber through an atmosphere sealing hood. With a capacity from 150 to 400 lb per hour, this furnace can be used for carburizing, case-hardening, clean-hardening, and other heat-treating operations without any modification. (The American Gas Furnace Co., Booth 728)

For more data circle No. 62 on postcard, p. 283

Ultrasonic Grinder

Visitors to the Metal Show will see a new ultrasonic impact grinder expected to be useful in the preparation of ceramic-base printed cir-

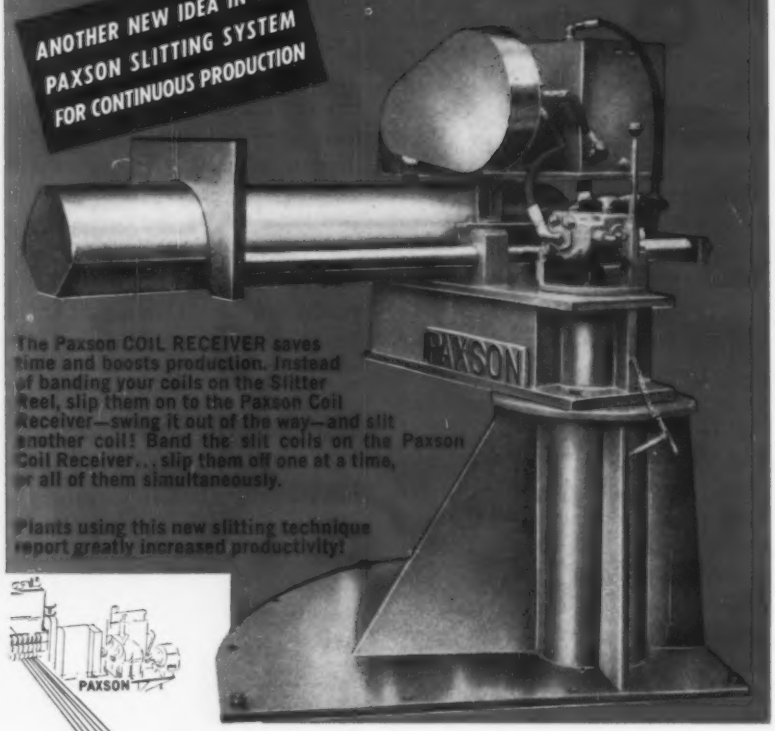
New! PAXSON COIL RECEIVER

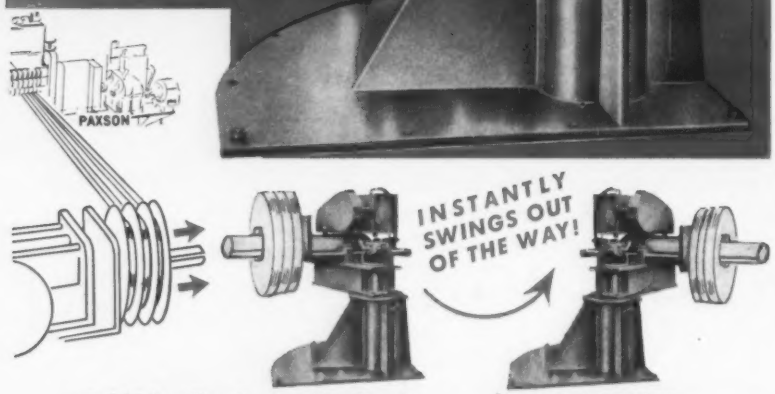
DOUBLES your Slitting System Capacity!
FREES your Rewinder for the next load!

ANOTHER NEW IDEA IN THE PAXSON SLITTING SYSTEM FOR CONTINUOUS PRODUCTION

The Paxson COIL RECEIVER saves time and boosts production. Instead of banding your coils on the Slitter Reel, slip them on to the Paxson Coil Receiver—swing it out of the way—and slit another coil! Band the slit coils on the Paxson Coil Receiver... slip them off one at a time, or all of them simultaneously.

Plants using this new slitting technique report greatly increased productivity!





...straight from the loaded Recoiler ➤ ...slip coils onto Paxson COIL RECEIVER ➤ ...COIL RECEIVER instantly swings out of way

One minute your Recoiler is loaded... the next minute the coils have been slipped onto the Paxson COIL RECEIVER ready for banding. Your reel is immediately free to receive strands from the next coil.

The rugged construction of the Paxson COIL RECEIVER assures years of trouble-free operation.

Built in both right-hand, and left-hand installations (right-hand model illustrated); height and diameter to customer's individual requirements. Capacity: To 30,000 lbs.

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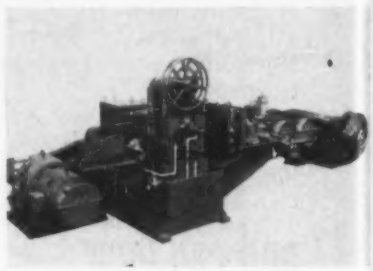
cuits for nuclear work and in other facets of the ceramics industry. Of 2500-w power, this model can cut areas up to 3½-in. diam. Reduced frequency (20 kc) makes this machine better able to machine these large diameters. Cutting, slicing, drilling, grinding, and trepanning can be accomplished to tolerances of ±0.0003 in. This grinder quickly, accurately, and economically machines regular or irregular cuts in ceramics, carbides, and other hard or brittle materials. It is especially adapted to making cuts not easily ground or molded. (Raytheon Co., Booth 1811)

For more data circle No. 63 on postcard, p. 283

Wire-Drawing Line

One company's featured exhibit will be a 5-in-1 wire-drawing line. It has a capacity of ⅜-in. entry round, and production speeds up to 600 fpm. Drawing wire through carbide dies, it flattens wire in a

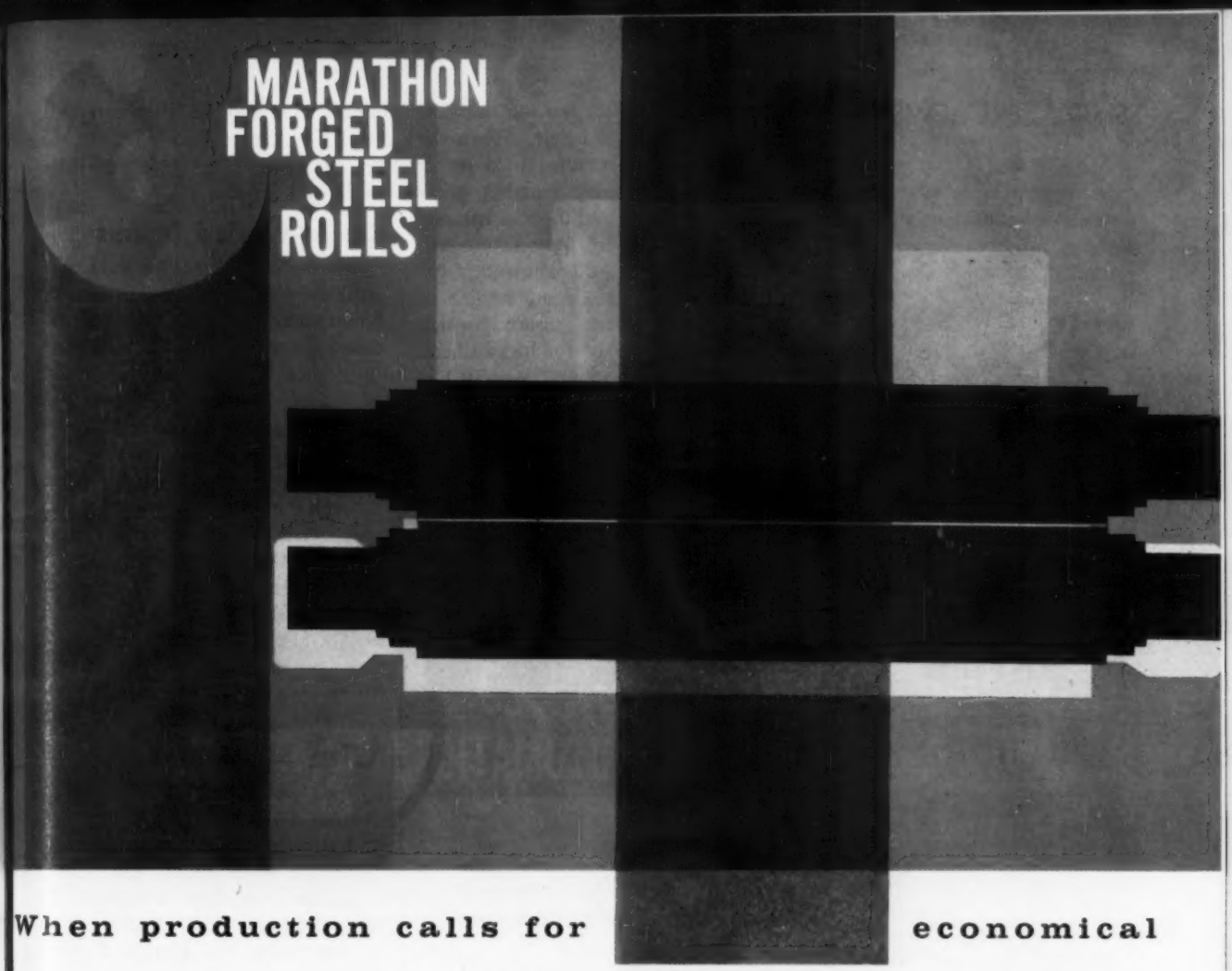


precision mill with water-cooled carbide rolls. It produces sizes, edges, and shapes in a versatile turks head. Gaging thickness with an electrolimit gage, it bundles wire in a variety of forms. (Fenn Mfg. Co., Booth 1329)

For more data circle No. 64 on postcard, p. 283

Inserting Tool

A new miniature automated inserting tool for high-speed production installation of wire thread inserts will be demonstrated for the first time. Capable of driving up to 1200 inserts per hour, the new hopper feed and lightweight gun combination is designed specifically for automated assembly-line opera-



When production calls for economical flat, cold rolling, specify Marathon forged alloy steel rolls. When production demands quality specify Marathon steel rolls . . . induction hardened with exceptional hardening depth . . . uniform hardness . . . internally sound . . . economical . . . available with all finishes. Ask for our Technical Bulletin SR 11. Further information and details gladly furnished on request.

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tion in any type or size of material where higher loading strength and greater resistance to wear are required in tapped holes. Weighing only 18 oz, the gun can be remotely operated up to 8 ft away from the hopper feed mechanism. In operation, a foot-actuated switch ejects an insert from the hopper mechanism through a nylon tube to the inserting tool tip. Then the operator simply presses the tool forward against the tapped hole. When the insert is fully installed to a preset depth, the driving mandrel automatically stops and the tool is ready for the next insert. Also shown will be miniature 4-40 screw-lock inserts, as well as a complete line of larger screw-lock inserts, which eliminate the need for lockwashers, lock wires, or locknuts. Various kits of inserts, taps and tools for thread repairs in machine tools, and industrial and plant equipment of all kinds will also be demonstrated. (Heli-Coil Corp., Booth 1559)

For more data circle No. 65 on postcard, p. 283

GRIND
POLISH
BUFF
DEBURR
WITH A
Hammond
STRAIT LINE AUTOMATIC
Over and Under Strait-Line shown. Other Strait-Lines available in Reversing, Horizontal Return and Open Center types.
Head styles include floating, non-floating and oscillating with 1-1/2 to 25 HP range.
Hammond Automatics will speed your grinding, polishing, buffing, brushing and deburring operations.
HAMMOND
Send Samples . . .
and we'll show you how much you can speed production and cut costs.
Hammond Machinery Builders INC
1612 DOUGLAS AVENUE
KALAMAZOO, MICHIGAN

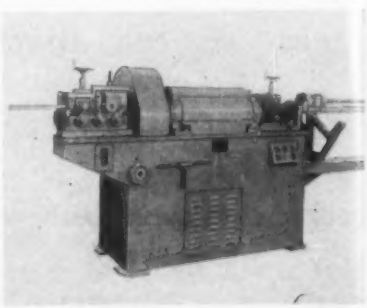
Color-Coded Drums

Color-coded drums for industrial solvents will be featured in an exhibit of a chemical line. This recent development was made to facilitate distributor and customer handling of drums. The containers are not only color-coded, but have side and top labeling to prevent handling and use hazards which might arise through "mistaken identity." Also spotlighted in this exhibit will be a cleaner called Chlorothene, with no fire point and low toxicity, and great versatility in dip, spray, wipe, and bucket cleaning. (The Dow Chemical Co., Booth 1047)

For more data circle No. 66 on postcard, p. 283

Wire Straightener

With infinitely variable speed control, a new-model machine cuts and straightens wire ranging from 5/32- to ⅜-in. diam, and offers a number of production features. A high-speed-type straightening arbor is used with five elongated split



dies, mounted on ball bearings for minimum vibration. A long-life limit switch trips a new improved target with positive setting and positive release. The drive shaft and flywheel are mounted on ball and roller bearings, respectively. (Mettler Machine Tool, Inc., Booth 1712)

For more data circle No. 67 on postcard, p. 283

Close-Quarters "Mike"

Among the new measuring tools and precision instruments to be exhibited by one company is this disk-type micrometer. It is designed to

Tempilstik°

*temperature indicating crayons**

**Also Tempil° Pellets and Tempilaq° (liquid form)*

Tempilstik°—a simple and accurate means of determining preheating and stress relieving temperatures in welding operations. Widely used in all heat treating—as well as in hundreds of other heat-dependent processes in industry. Available in 80 different temperature ratings from 113°F to 2500°F . . . $2.00 each.

Send for free sample Tempil° Pellets. State temperature desired . . . Sorry, no sample Tempilstiks°.

Most industrial and welding supply houses carry Tempilstiks° . . . If yours does not, write for information to:

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Old Method – time consuming, requires two men

La Deau Method – takes just one man, is six times more efficient!

NEW TURNOVER CRADLES PALLETIZE COILS WEIGHING TO 40,000 LBS. IN SECONDS

Producers or users of coiled materials can now palletize coils weighing from 3000 to 40,000 pounds in 14-40 seconds with the completely automatic La Deau TURNOVER CRADLE. You save up to 400% in storage efficiency, 600% in labor efficiency, and eliminate elongated coils and dangerous band breakage. If you handle *only a carload of coiled materials per month*, you can pay for a TURNOVER CRADLE in about a year, with labor savings alone. Reason: the fully portable Cradle lets one man handle as much material in one hour as two men usually handle in three hours!

FORK TRUCK SETS COILS AND PALLET ON EDGE
CRADLE TIPS BACK, BASE REVOLVES, FRONT TO BACK
CRADLE ENDS 90° ROLL OVER, BASE COMPLETES 180° TURN
PALLETIZED COILS ARE READY TO FORK

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LEADED COLD DRAWN BARS

has definitely increased their production, extended tool life, and produced a better finish at higher machining speeds.

Why not check the possibilities of Wyckoff Leaded Steels on your requirements? They're available in AISI analyses—carbon and alloy steels.

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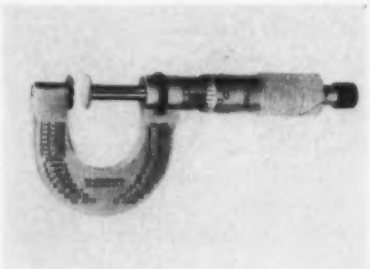
WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels • including Carbon Corrected Steels

measure the thickness of closely spaced sections, where distance between sections is as little as 0.015 in. Thin, tapered anvil and spindle disks are both ½-in. diam, 1/16-in. thick, and only 0.015 in. thick at



the outer edges. These thin disks can be inserted into narrow grooves, slots, or recesses; between projecting ribs, lands, or fins; and between steps on forming tools or between gear teeth for measuring chordal thicknesses. This micrometer is available in 0-to-1-in. size graduated in thousandths, in satin-chrome finish, with or without locknut or ratchet stop. (The L. S. Starrett Co., Booth 1256)

For more data circle No. 68 on postcard, p. 283

Fast Profile Miller

A new high-speed profile milling machine which cuts simple radii and irregular shapes in seconds with no setup or layout will be demonstrated at the Metal Show. It is available as either an automatic or

a semiautomatic machine. No experience or training is needed to run it. The operator simply slips the material to be profiled in a simple vise and moves a handle

Hyde Park
Gray Iron and Alloy Iron Castings up to 80,000 Pounds!

ROLLS
Alloy Iron Rolls
Grain Rolls
Chilled Rolls
Nickel Chilled Rolls
Moly Rolls
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Pinion Stands
Roller Tables
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Sheet Mill Shears
Roll Lathes
Special Machinery
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We have been making miscellaneous Castings for
WEIRTON STEEL COMPANY
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Twenty Years!

Our foundry and machine shop facilities are equal to any of your requirements.

Castings up to 80,000 pounds—
Furnace Castings • Machinery Castings
Heavy Die Castings • Slag Pots
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Floor Plates

RED CIRCLE Rolls ALLOY-CHILLED

Hyde Park
FOUNDRY & MACHINE CO.
HYDE PARK, WESTMORELAND COUNTY, PITTSBURGH DISTRICT, PA.

Let's Talk About Vacuum Crucible... Ingot Mold...Quality...

WHAT DOES QUALITY MEAN IN LESS "DOWN TIME," ADDED "PRODUCTION" AND "SAFETY" AND HOW DOES ZAK GET IT?

COPPER WELDED JOINTS

First of all, we know that with copper weld construction of vacuum crucibles or ingot molds, strength, thus quality, is *built in* far in excess of that obtained from obsolete methods of bonding copper to copper, copper to steel, copper to stainless. This strength gives added safety and protection through the ability of our products to withstand higher temperatures.

"IN PLANT" TESTING FOR QUALITY

Secondly, all of our crucibles are "in plant" tested for pump down and leak rate, measured in microns and *certification of the test is issued with delivery.*

ZAK QUALITY CRUCIBLES

Give longer life; less "down time"; safety and protection under production schedules that "break down" ordinary crucibles.

WE'LL QUOTE!

Check with us before you order. Vacuum equipment for special applications in melting, annealing, processing. Vacuum furnaces.

"Engineering Manufacturers For Industry"

ZAK MACHINE WORKS, INC.

TROY (GREEN ISLAND) NEW YORK

through the 180° arc. On automatic, the tool feed is started with a pushbutton. The semiautomatic model is designed for cutting simple radii. The automatic model will produce any profile within a 180° arc, milling irregular shapes as well as true radii in a fraction of the time required by other methods. Both models will be displayed at the Show. (The McKay Machine Co., Booth 1843)

For more data circle No. 69 on postcard, p. 283

Testing Equipment

Among a line of testing equipment to be displayed are three models of eddy-current instruments for testing and sorting parts, both magnetic and nonmagnetic. There are three models. One evaluates and sorts magnetic parts for various metallurgical properties. A second,

for both magnetic and nonmagnetic materials, is a probe-type instrument used to detect cracks; sort according to hardness, heat-treat condition, and alloy; and measure coating and film thicknesses. The third, for nonmagnetic materials, measures electrical conductivity in absolute units and determines hardness, alloy, heat-treat condition, and tensile strength. (Magnaflux Corp., Booth 865)

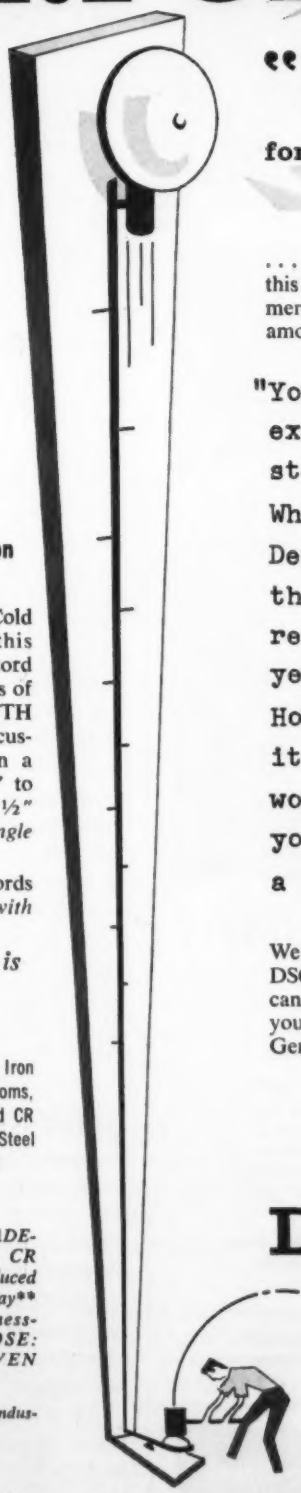
For more data circle No. 70 on postcard, p. 283

Salt-Bath Quenching

In one company's booth, operating features of a salt-bath cataract quench furnace will be demonstrated on closed-circuit television. The furnace offers any needed quench flow velocity at the turn of a crank.

Detroit Steel
PERFORMANCE
"rings the bell"

for a major heating furnace manufacturer



. . . and we quote from an unsolicited letter reporting this organization's recent "detailed evaluation of the merits and capabilities of our steel suppliers . . . among whom Detroit Steel is now one of our largest."

"Your delivery and service have been excellent. These two factors make a steel buyer's duties much more pleasant. When it comes to quality, this is where Detroit Steel Corporation really "rings the bell." We have had not one single rejection against your company in five years. Maybe part of this is sheer luck. However, I would be inclined to think it is the end result of a lot of hard work, know-how and a desire to improve your position in the industry by doing a good job.

We invite you to look into the probability that the performance of DSC-PORTSMOUTH Accutronic* COLD ROLLED SHEET STEEL can "ring the bell" for you, too . . . Talk over your requirements with your DSC Customer "Rep" — or write Detroit Steel Corporation, General Sales Office, Box 4308, Detroit 9, Michigan.

"Not one single rejection in five years"

The DSC Accutronic* Cold Rolled Sheets scoring this long-term performance record were supplied in thousands of tons by our PORTSMOUTH DIVISION . . . Rolled to customer specifications, in a thickness range of .0239" to .0897", in widths from 27½" to 48"— and *"not one single rejection in five years."*

DSC job-performance records show the way we'll work *with* and *for* you.

Customer satisfaction is our No. 1 Job.

DSC PRODUCTS

Coke . . . Coal Chemicals . . . Pig Iron Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods . . . HR and CR Sheet and Strip . . . Flat CR Spring Steel Mfrs'. and HC Specialty Wire Welded Wire Fabric

*Accutronic *is a DSC TRADE-MARK, descriptive of DSC CR Sheet and Strip Steels, cold reduced on mills equipped with AccuRay** electronic feed-back thickness-control systems. PURPOSE: LEVEL GAUGE and EVEN TEMPER.*

***A registered trade-mark of Industrial Nucleonics Corporation*

The PROOF of DST®

DETROIT STEEL

is in its performance on your job

Customer "REP" Offices in Principal Cities

COPYRIGHT DETROIT STEEL CORPORATION 1959

This ultra-critical control permits quenching results previously unobtainable and insures meeting practically any TTT curve requirement with remarkable precision. Results are readily reproducible. Work of practically any shape or size within the physical limitations of the furnace can be handled. This quench can do anything that can be done in an agitated oil. Beyond the range of oil, at temperatures around 750°F, results far surpass those obtainable by other methods, and there are no fire hazards involved. In addition, this type of quench provides all of the inherent advantages of salt-bath heat treatment, including uniform hardness, the elimination of quench cracks, and negligible distortion. The furnace has an internal heating system to bring the salt quickly up to operating temperature. Once the furnace is in operation, forced air circulation between the port and casing wall helps dissipate heat from the work. A chief feature of the design is the fact circulation of the molten salt is concentrated in the work area of the bath. A cylinder-like "header" inserted in the working center of the quench chamber is connected at the bottom to a variable-speed pump. Work inserted into the header is thus exposed to a highly concentrated rush of molten salt that extracts the heat with remarkable accuracy and efficiency. Quench flow velocities far in excess of anything heretofore available are obtainable thanks to this "header" feature. In most applications, salt is caused to flow downward through the header, although it can also be directed upward at high velocities without splashing. When high-velocity agitation is not required, such as in liquid flame - hardening processes, the header can be removed and the quench operated with any desired degree of ordinary pumping circulatory action. Still another feature provides a completely automatic system for carrying off any drag-in salt carried into the quench from a molten salt heating bath. This continuous separating action does much to maintain the bath's exceptional quenching power. Also, water addition can be made to the molten salt to materially increase its quenching power. This is handled by an automatic device, and has been done successfully and without danger at temperatures over 700°F. (Ajax Electric Co., Booth 1526.)

For more data circle No. 71 on postcard, p. 283

the economy of miller quality

.... becomes evident after sufficient exposure to the original cost/maintenance costs/production/profits equation.

Exploiting the full potential of better basic design, the Miller Gold Star 300 series ac-dc welders convert in minutes from the prime ac-dc welder of exceptional performance to any of these three A-C applications: Metallic Arc, manual or automatic Inert Gas; or, to any of the following D-C applications: Metallic Arc, manual or automatic Inert Gas, or Inert Gas spot welding.

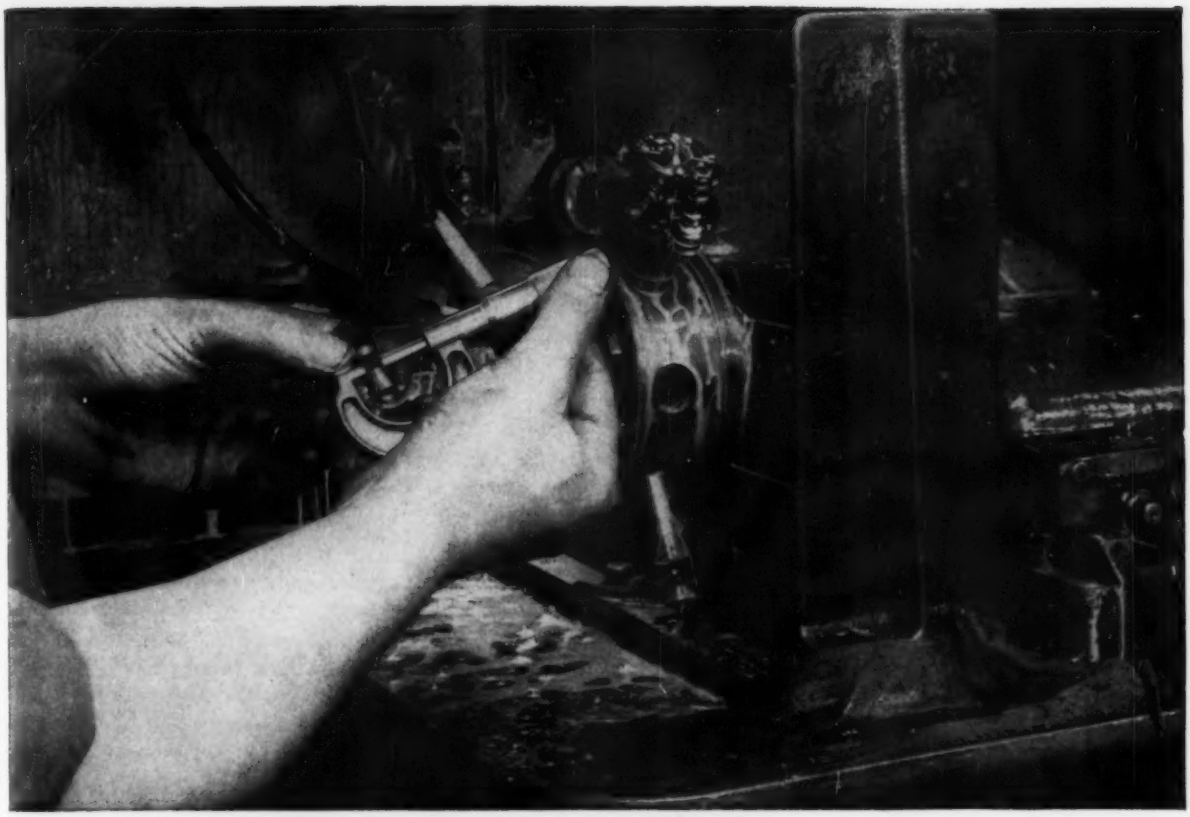
It's important to note that the Miller conversion kits utilized to obtain any of the above simply extend the built-in superiority of the 300 series' welding characteristics into the type of application desired. It's adaptable by design — not discovery.

Available in 200, 300, 400 and 600 ampere models, all feature the exclusive Miller transformers and semi-metallic rectifiers. Complete specifications, including duty cycle chart, will be sent promptly upon request.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN
• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

Refractory Metals

A supplier of metals for high-temperature and nuclear application will exhibit at the Show. The display will include samples of metals of extra high purity for elevated-temperature application, including tungsten, molybdenum, tantalum, columbium, hafnium, and zirconium. These metals owe their high purity to production by an electron-beam furnace, which melts metals in high vacuum with beams from two electron guns. Columbium, for



Machinecraft gets .0005" tolerances with Cities Service Chillo Cutting oils!

Machinecraft, Inc., of Whitman, Massachusetts, makes a product that is surely the answer to many a textile man's fondest wish.

In place of old-style solid arbor top rolls, which often drip lubricant onto the fabric, Machinecraft has developed "the anti-friction top roll."

Operating on ball bearings, this unique invention requires almost no lubrication, therefore eliminates staining problems. In addition, it permits higher speeds of operation and produces more uniformly woven fabric.

In all of this, extremely intricate machining is required —and Cities Service Chillo Cutting Oil plays a crucial role.

Using Cities Service Chillo "A," Machinecraft is actually achieving tolerances as fine as .0005"! Moreover, Machinecraft reports that Chillo "A" gives "excellent tool life, produces a fine finish, has unusual stability, and offers continuous quality from batch to batch."

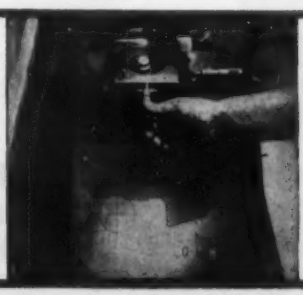
"In addition," continues this well known firm, "Cities Service provides us with exceptional technical assistance and good delivery service."

There's little to add to what Machinecraft says except a reminder that *you* can expect similar results with Cities Service, too. Talk with a lubrication engineer from the nearest office. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

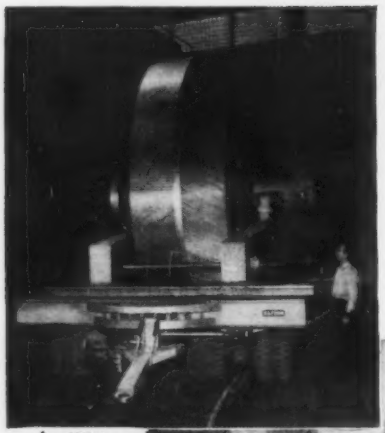
QUALITY PETROLEUM PRODUCTS

Machinecraft's Anti-Friction Top Roll is rapidly replacing old-style solid arbor type top rolls in textile mills. It prevents staining, permits greater operating speeds.



Shadowgraph is method of checking accuracy of precision machined parts for anti-friction top roll. Machine magnifies and projects the part's shadow outline. Tolerances are as fine as .0005".

Put your **HEAVY LOADS** *on* **WHEELS**!



...with EASTON heavy duty industrial cars and trailers designed and built with the know-how developed through 45 years of service to all areas of heavy industry.

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A-1069

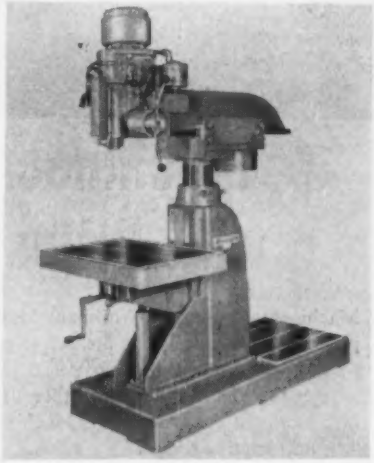
AMERICAN
SHEAR KNIFE CO.
HOMESTEAD, PENNSYLVANIA

example, is purified so highly that a 3-in. bar can be rolled into foil 0.0005 in. thick without annealing The main feature of the exhibit will be a visual-aid cutaway which shows the function of an electron-beam furnace. In addition, samples of all six metals in various forms from ore to foil will be displayed. (Wah Chang Corp., Booth 1560.)

For more data circle No. 72 on postcard, p. 283

Novel Radial Drills

Two work stations—a table and a platform, accessible through 360° ram rotation — are provided in a line of precision radial drilling machines, to be displayed in operation. The 20 x 40-in. adjustable table and the 22 x 24-in. rear work platform utilize accurately ground work surfaces incorporating T-slots and coolant trough. The sliding 3-ft radial arm moves on precision roller bearings, and ram and column are precision-ground to permit sensitive and fast adjustment of drill head over hole locations. The column raises 12 in., giving 53 in. maximum distance, spindle to work surface. The unit can process a workpiece over 4 ft high and 6 ft diam. Three models have drill capacities up to 1¾ in. in cast iron. All units incorporate direct gear drive with positive speeds in various ranges from 45 to 3000 rpm. Attachments to be shown include power feed to spindle, power elevation and power



THE TONY ACCETTA "PET" SPOON, made of Revere Brass Strip has been awarded the Medal of Honor by Sportsman's Club of America for superiority of design and fish-getting ability while all Tony Accetta Baits have received National Sportsman's Research Award . . . a real tribute to design, construction and effectiveness.

Revere helps "fit the metal to the job"

AND A BAIT MAKER SAVES ON FORMING AND FINISHING COSTS WHILE PRODUCING AWARD-WINNING LURES

The fishing lures of Tony Accetta & Son, Riviera Beach, Florida, are known all over the world for their ability to catch fish. That's due to design. They are also known for their fine workmanship and ability to take a hammering on rocky reefs and shoals, and still retain their ability to attract fish. That's due to the material from which they are made . . . a Revere Brass with special grain size and finish.

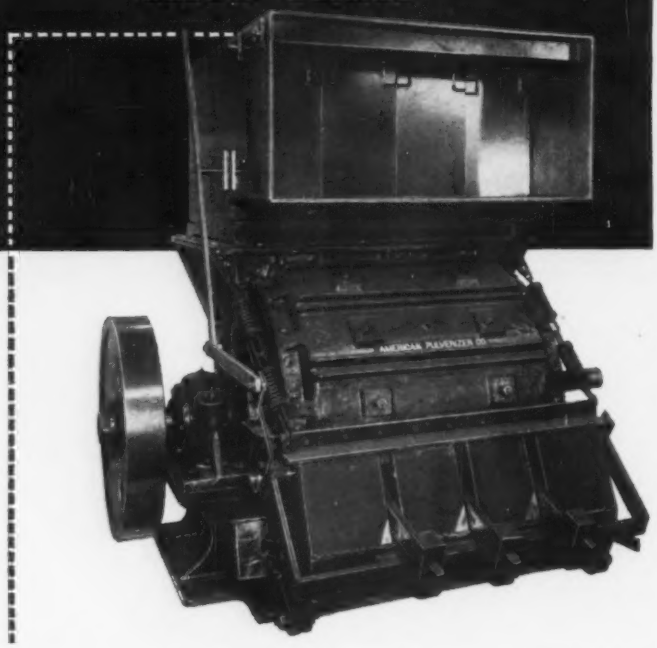
Says the Senior Accetta, "The high quality of Revere Brass has, without a doubt, contributed immeasurably to the quality of our lures. In fact, Revere Brass is of such fine quality and finish, uniform grain size and structure that even after stamping and forming only a minimum of work is required prior to chromium plating. This means we save on both forming and finishing costs. Since we have been using Revere Brass we have not had a single customer complain due to poor quality material."

Why not put the extensive knowledge of Revere's sales representatives to work for you? With the wide variety of metals at their disposal, perhaps they can help you select the metal best suited for the job, with a resultant saving of money while improving product quality.

REVERE COPPER AND BRASS INCORPORATED
230 Park Avenue
New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Fort Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

convert metal turnings into cash

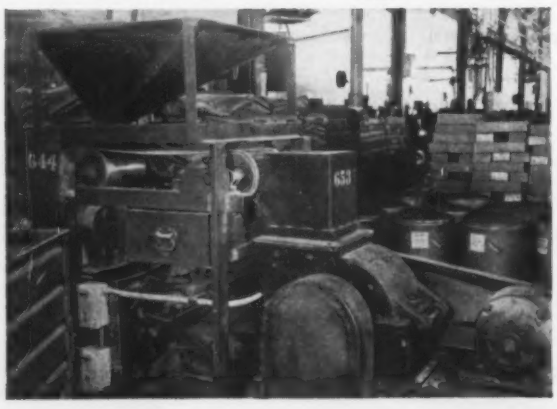


Long, curly, troublesome metal turnings, reduced in an American Metal Turnings Crusher, can produce additional profits for your plant.

Reduced to chip form, metal turnings bring $2 to $5 more per ton. Handling metal chips by shovel or pneumatic systems is easier, too, and chips require 75% less storage space than bulky machine turnings. You'll recover more cutting oil from chips . . . up to 50 gallons per ton! More important, American Metal Turnings Crushers pay for themselves and produce substantial profits for years to come. Models available with capacities ranging from 1 to 50 tons per hour. To get all the details, write American today.

reclaim fused welding flux

One industrial plant saved more than $10,000 a year by using an American Welding Flux Crusher to regranulate fused welding flux. Write American for details.



American PULVERIZER COMPANY

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

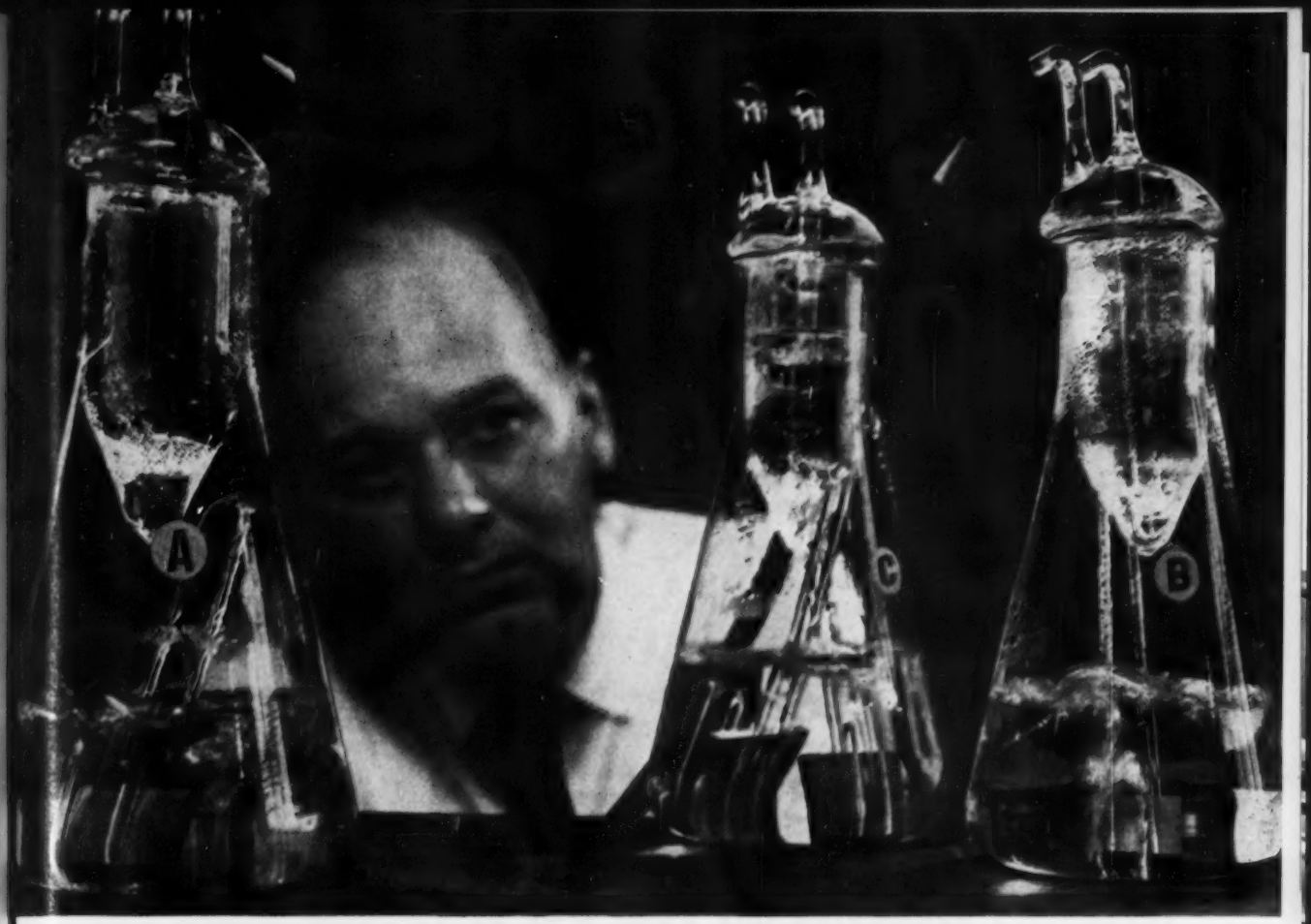
1439 MACKLIND AVE. SAINT LOUIS 10, MISSOURI

locking, and automatic tapping. A machine arranged for multiple-spindle drilling with both turret-type head and multiple-spindle head will also be exhibited. (The I. O. Johansson Co., Booth 1355.)

For more data circle No. 73 on postcard, p. 283

Radiation Thermometer

A new scientific instrument especially designed for industry uses a method of temperature measurement new in the field. Utilizing advanced methods of infrared detection, a radiation thermometer automatically measures and controls the temperature of moving or stationary objects without physical contact. Operation, to be demonstrated, is completely remote and unattended. Perhaps its most important potential is for automation on the production line. One leading manufacturer of metal products, for example, is already using this instrument to automatically measure temperatures of inaccessible product surfaces. Other applications include nondestructive testing and assembly-line inspection. Basically, this radiation thermometer operates on the principle that an object emits thermal, or infrared, radiation as a function of its temperature. This thermal radiation from an object is received by the instrument, translated into a signal voltage, and amplified to a level sufficient to drive an indicator calibrated directly in temperature. Sensitivity is high (7° at 2000°F), and instrument response is rapid and accurate, completely automatic and continuous. Specifically designed for in-plant use, it combines sensitive instrumentation with the day-to-day demands of industry. The infrared sensing element is hermetically sealed within an optical head (a sturdy, dust-tight, 9½-in. casting which is unaffected by in-plant vibration and shock). This optical head is small enough to bolt onto any surface at a given working distance and aim in any direction at the object to be measured. The lowest standard range is 180° to 400°F,



Here, boiling nitric acid is used to evaluate the corrosion resistance of Jessop stainless steel plate.

"How Jessop Tests Stainless Steel in Boiling Nitric Acid"

L. W. Cooper, Chief Metallurgist

"From experience, our customers know this is a fact: Specify Jessop for specialty steels . . . and then relax! Of the many reasons *why* this is true, here's one . . .

"In evaluating corrosion resistance, one of the procedures we use is the ASTM boiling nitric acid test. Standard and simple? Yes. But expert *evaluation* is of great importance to the customer. That's why, at Jessop, a top metallurgist closely supervises each of the five 48-hour test periods.

"*Overly cautious?* Because we're overly cautious in *every* phase of steel production and quality control, Jessop has earned the reputation for producing specialty steels tailor-made to the most exacting specs— *Specify Jessop . . . and then relax!*"

Checking the grain size of tool steel, this Jessop metallurgist uses a microscope with a camera attachment. VMA 6767

JESSOP
STEEL COMPANY
Washington, Pennsylvania

Green River Steel Corporation
Jessop Steel of Canada, Ltd.
Jessop Steel International Corporation
Steel Warehousing Corporation, Chicago

Stainless, alloy, tool, cast-to-shape, clad, and forging steels, ground flat stock and other specialty steels

Model 210 A-W hydraulic cranes speed erection of building at Columbus (Nebr.) plant of Behlen Mfg. Co., manufacturer of Behlen Frameless metal buildings and agricultural equipment.

Materials handling manager says:

"...Haven't considered any other type of handling equipment since first A-W crane!"

Behlen Mfg. Co., Columbus, Nebr., owns three model 210 Austin-Western self-propelled cranes. Materials handling manager Howard Brunken says, "The Austin-Western hydraulic cranes are great improvements over our previous materials handling equipment.

Well satisfied

"We bought them because of their versatility and ability to maneuver into tight corners with all-wheel steering. We're well satisfied with their superior performance.

"The 18-ft. telescoping booms, which rotate in full circles, are important features for both inside and outside operations. Hydraulic controls, all-wheel drive and steering make the crane easy to operate with precision.

"We use the Austin-Westerns to handle all heavy, cumbersome loads. It seems that every day we do something unusual with our cranes because of their great versatility. Since using the first one, we have not considered any other type of handling equipment!"

Three models available

A-W hydraulic cranes are now available in three models—the 210 self-propelled rubber-tired unit; the 210-P for special truck or stationary mounting; and the 220 with counterweighted boom for greater lifting capacity. Choice of gas or diesel power . . . wide range of optional attachments.

Learn how Austin-Western hydraulic cranes can add profits by safely speeding your materials handling. Investigate! See your nearby A-W distributor now or write to us today for full information.

Austin 100th YEAR Western
CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.
BALDWIN · LIMA · HAMILTON
Power graders • Motor sweepers • Road rollers • Hydraulic cranes

and the highest is 700° to 2000°F, although higher temperature ranges are available for special applications. The instrument is unaffected by ambient temperature variations from 20° to 120°F. Units are available with indicators, controllers, or recording potentiometers. (Radiation Electronics Co.)

For more data circle No. 74 on postcard, p. 283

Spray Guns

More than 50 different spray guns for manually or automatically applying all kinds of liquids, mastics, adhesives, and finishing materials are a feature of one company's exhibit. The exhibit will also contain the company's new airless spray equipment and equipment used to spray the new rigid urethane foams used for sound and thermal insulation, protection against corrosion, and packaging filler. (The DeVilbiss Co., Booth 634.)

For more data circle No. 75 on postcard, p. 283

Temp. Indicators

An expanded line of temperature-indicating materials will be displayed. The exhibit will feature a demonstration of various applications that these products find in the heat-treating problems connected with welding and metalworking. The line includes crayons, lacquers, and pellets for temperature indication. On display will be crayons and lacquers for 2300°, 2400°, and 2500°F use, bringing to 80 the number of specific temperature ratings available in these lines. Sample pellets for 325°F will be available. (Tempil Corp., Booth 225.)

For more data circle No. 76 on postcard, p. 283

Heat-Treating Units

Several units for various heat operations will be featured in one company's exhibit. A cold-wall vacuum furnace can be used for sintering, heat-treating, or degassing at temperatures up to 2200°C (4000°F). Also on display will be a vacuum melting and precision casting furnace for the preparation of small

quantities of high-purity metals and the production of precision-contour parts by investment casting or permanent-mold casting techniques. A mechanical booster vacuum pump (1100 cfm capacity), which will also be shown, is for rapid evacuation of large spaces such as high-altitude simulation chambers, and for vacuum processing systems such as baking ovens for the brazing and fusing of semiconductor components, rotating dryers for heat-sensitive chemicals and plastics, and so forth. (F. J. Stokes Corp., Booth 542.)

For more data circle No. 77 on postcard, p. 283

Hardness Tester

A Rockwell Superficial hardness tester is intended for the testing of extremely thin sheets, nitrided steel, and lightly carburized steel. It employs light loads and a sensitive depth-measuring system. It can be used for performing macro- and

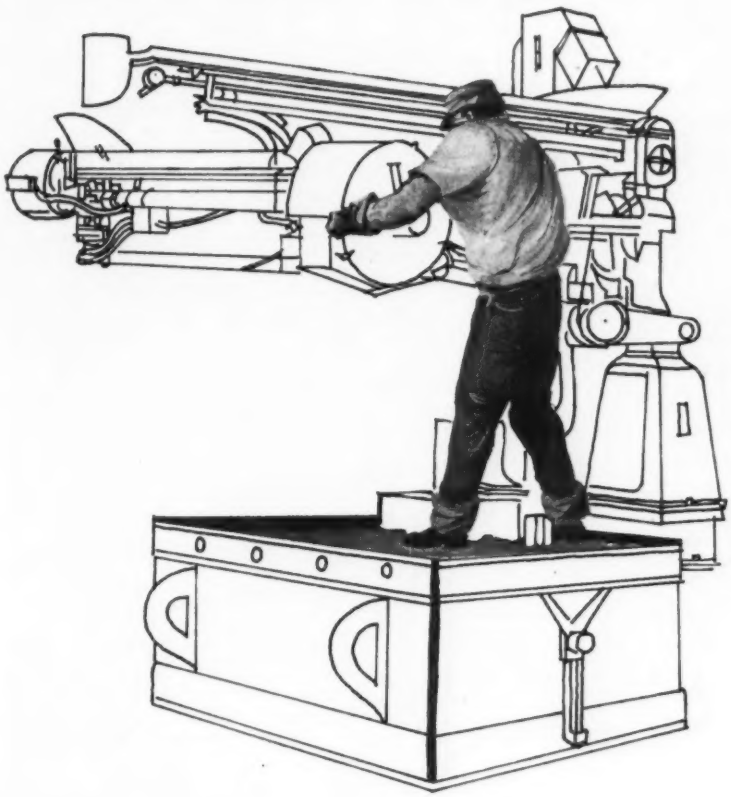
micro-hardness tests. This tester will be on display, along with a combination unit capable of taking readings in both the Rockwell and Rockwell Superficial scales. (Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc., Booth 953)

For more data circle No. 78 on postcard, p. 283

NEW FILM

"Handling Materials in the Steel Industry" shows the wide range of equipment used in all phases of steelmaking, with special attention to the handling of steel coils through processing to final shipment. 25 min. 16 mm, color, sound. Public Relations Dept., Link-Belt Co., Prudential Plaza, Chicago 1.

men, metal and machines



SERVICE FOUNDRY

Men who know metal . . . design engineers, pattern makers, skilled foundrymen, metallurgists. *Metal* . . . all types, including high alloy, corrosion-resistant stainless steel. *Machines* . . . a full complement of production facilities, type and capacities to handle all standard as well as unusual work. Steel castings to 16,000 lbs.—non-ferrous to 2,500 lbs. These are the elements that guarantee superior castings—the only kind produced by SERVICE FOUNDRY.

Write for our complete brochure, *Foundry Work—Steels, Alloys & Non-Ferrous*

VERSATILE BUILDER ON THE MISSISSIPPI

AVONDALE

MARINE WAYS, INC.

Service Foundry DIVISION

416 ERATO ST. • JAckson 2-3836 • NEW ORLEANS 13, U.S.A.

1 DRAWS entry wire to accurate size through carbide dies

2 FLATTENS wire in precision 8" mill with water cooled carbide rolls

3 SIZES AND EDGES SIZES AND SHAPES in versatile Turks Head

4 GAGES thickness with P & W electro-limit gage

5 BUNDLES traverse wound coils, traverse wound spools, loose coils.

PRICE UNDER $35,000
DELIVERY 10 WEEKS

Here is the new Fenn 5-in-1 Wire Line with a price as remarkable as its performance and compactness. It will produce precisely flattened or shaped, edged, and sized bundles at speeds up to 600 FPM in an absolute minimum of floor space. Inlet capacity up to 3/8" diameter. The Precision Fenn 8" Roller Bearing Rolling Mill has carbide shell rolls with internal and external cooling. The entire line operates from a single, infinitely variable speed AC motor with simple electric controls. The 5-in-1 Wire Line is engineered and built to Fenn quality standards. Write for complete specifications.

See it in operation at Fenn Booth No. 1329—National Metal Exposition

THE FENN MANUFACTURING COMPANY • 306 FENN RD. • NEWINGTON, CONN.

New Materials and Components

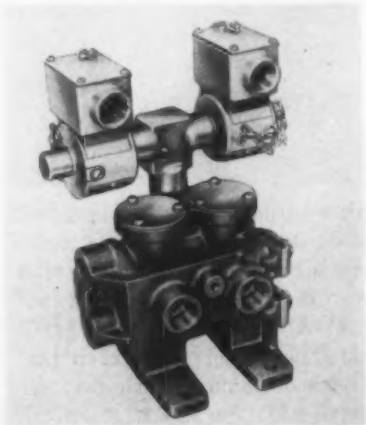
HSS Bearing Balls

Precision balls of high-speed steel (M-10, vacuum-melted) are available in 13 sizes from 1/16 to ½ in. Other sizes can be supplied on request. Made to precision tolerances of ±10 millionths on both size and sphericity, they have a 2-micro in. finish, and are ideal for bearings and other components operating at up to 900°F. (Industrial Tectonics, Inc.)

For more data circle No. 79 on postcard, p. 283

Four-Way Air Valves

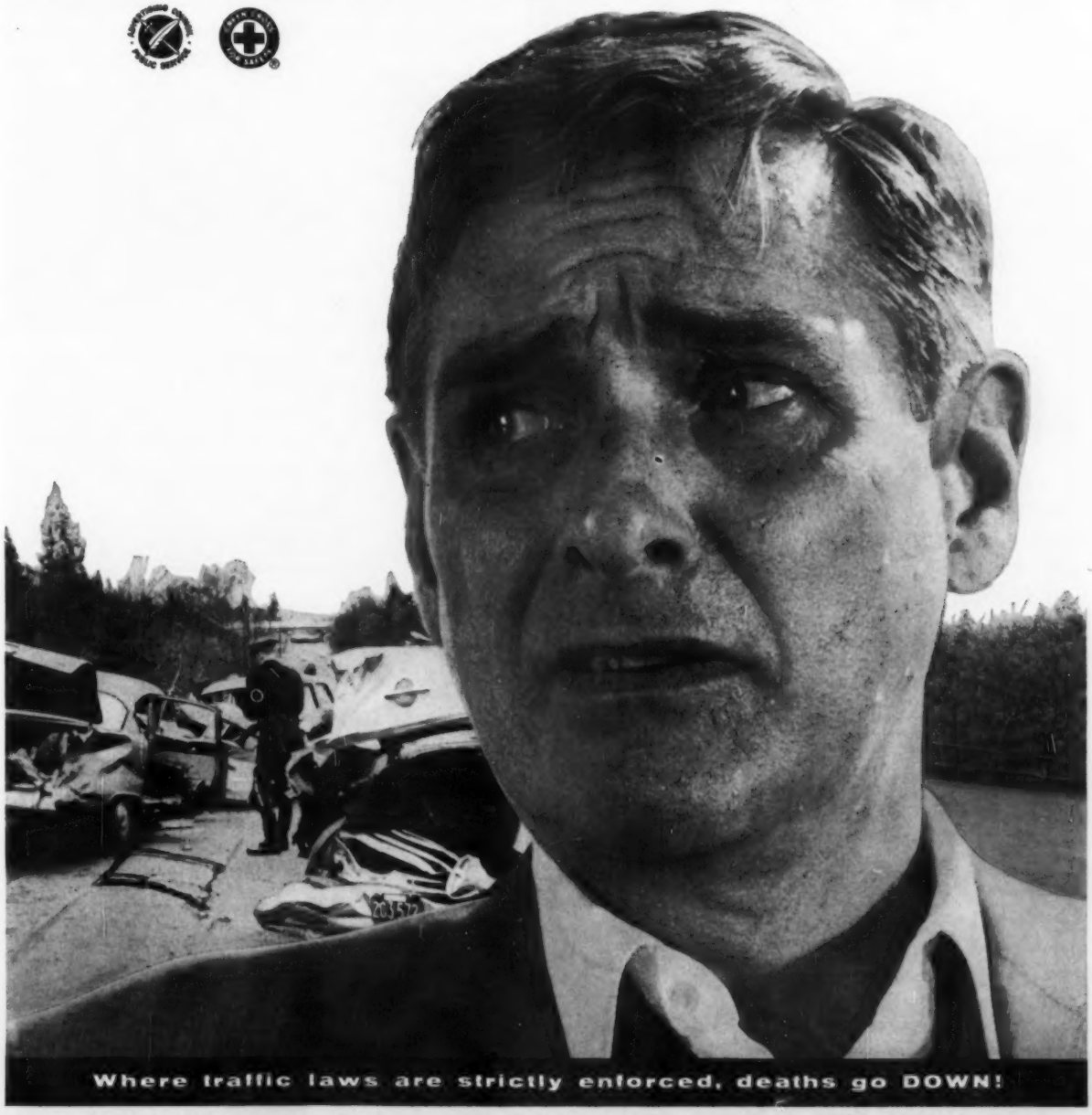
A line of two-position, four-way air valves feature foolproof operation. Current is applied only for the instant it takes the valve to change position. A momentary-contact device then "latches" the pilot (and



main) valve in this position, even after power is cut off. When an electric impulse once again energizes the solenoid, the solenoid plunger "unlatches" the contact device and allows the pilot and main valve members to revert to original position. Dual solenoid units, for use in automated systems, insure against the valve's getting out of phase. Here, the actuating solenoid will not unlatch the pilot valve, but the valve will revert to original

"I wish I could have done something to help . . ."

You <u>can</u> do something about traffic accidents! Drive safely yourself—obey the law. Sure. But you can do a lot *more!* Traffic accidents affect *everybody.* Reducing them is a community problem. Its solution calls for systematic, organized effort and cooperation with public officials—for teamwork and leadership. Here is where *you* can help. Join with others who are working actively to promote safe driving and secure strict enforcement of all traffic laws. Make your influence count. *Support your local Safety Council!*



Published in an effort to save lives, in cooperation with the National Safety Council and The Advertising Council.

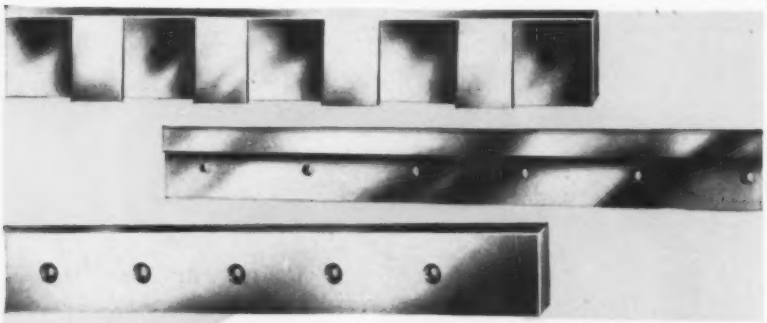
position only by actuating the second solenoid. (Barksdale Valves)
For more data circle No. 80 on postcard, p. 283

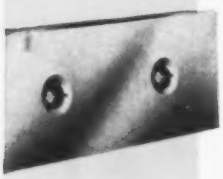
Insulating Firebrick

Very light in weight and low in thermal conductivity, a new insulating firebrick has greatly improved strength. Better mortar bonding and resistance to gas erosion are other features. (The Babcock & Wilcox Co.)
For more data circle No. 81 on postcard, p. 283

Super-Pure Aluminum

Aluminum of guaranteed 99.992- and average 99.996-pct purity is available in the form of pigs, ingots, billets, pellets, coiled sheets, and foil. It is also available in alloys comparable to common aluminum alloys and having greater structural strength than the pure form. Useful in refining and processing where its low iron and copper contents are important to the refining and alloying of other metals, it also boasts high corrosion resistance, and is thus coming into use in decorative items and structural components subject to corrosion. The elongation values of the super-pure aluminum make it especially suitable for extremely intricate forming. (Aluminum Foils, Inc.)
For more data circle No. 82 on postcard, p. 283





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Get burr-free cutting with WAPAK blades. Fit any shear for any type of shearing. Engineered to specifications that assure thousands of extra cuts with first-cut accuracy.

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WAPAK MULTICUT — Abrasion resistant high-carbon, high-chrome tool steel, heat-treated in electrically controlled furnaces to maintain exact hardness requirements. Shear cold metals such as mild steel maximum .250 thickness or equivalent in tensile strength in other metals such as stainless steel, automobile sheets, high silicon sheets, tin plate, strip steel, copper, brass and aluminum. Cuts from 4 to 10 times amount formerly sheared with carbon steel blades.

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Self-Aligning Block

A self-aligning pillow block using the ball-joint principle consists of an oil-impregnated bronze bearing nested in an aluminum diecasting. Low-cost, it is self-lubricating, and comes in shaft sizes of ½, ⅝, and ¾ in. (Bronze Bearings, Inc.)
For more data circle No. 83 on postcard, p. 283

NEW BOOKS

"Zinc: The Science and Technology of the Metal, Its Alloys and Compounds," ed. by Prof. C. H. Mathewson, is a definitive monograph covering the field from geology through the end product. Forty-five specialists are represented on the subjects of zinc's metallurgy, chemistry, extraction, and uses. 721 pp. $19.50 per copy. Reinhold Publishing Corp., Dept. 156, 430 Park Ave., New York 22.

"American Standard Taps—Cut and Ground Threads, B5.4-1959," is the latest revision of the American Standard on taps. It includes styles, nomenclature and definitions, thread series data, and dimensional and tolerance tables for right-hand-thread taps of all types. 48

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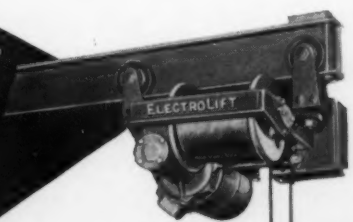

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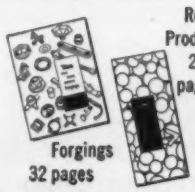

Rod Products 24 pages

Forgings 32 pages

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NEW BOOKS

pp. $2.50 per copy. American Standards Assn., 70 E. 45th St., New York 17.

The American Welding Society has brought out a comprehensive manual on soldering. It covers principles, solders, fluxes, joint design, preparation, equipment, and procedures. Specific information is included on all metals and alloys to which soldering is applicable. 176 pp. $5 per copy. American Welding Society, Dept. T, 33 W. 39th St., New York 18.

"Programming Business Computers," by H. Weiss, T. Lee, and D. D. McCracken, explains the application of computers to business problems. It covers the analyzing of business problems and procedures, and the development of computer solutions. 500 pp. $10.25 per copy. John Wiley and Sons, Inc.

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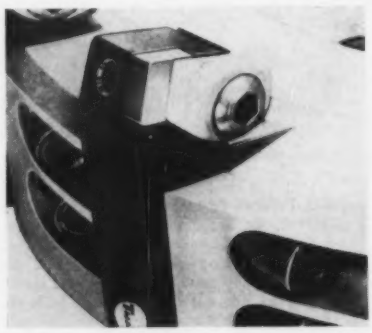
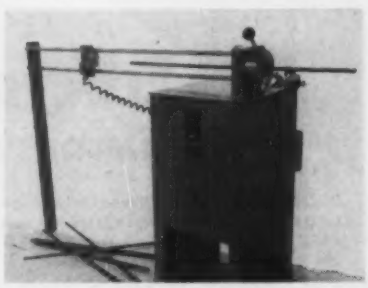


of the clamp locking screw. The design is presently available in a negative-rake style with standard tool angles. (Sandvik Steel, Inc.)

For more data circle No. 84 on postcard, p. 283

Tube Cutter

Using from one to three cutters, depending on material and wall thickness, a machine cuts thin-wall tubing in any length with little or no burr. Tubing is fed through the cutting head, which is activated by

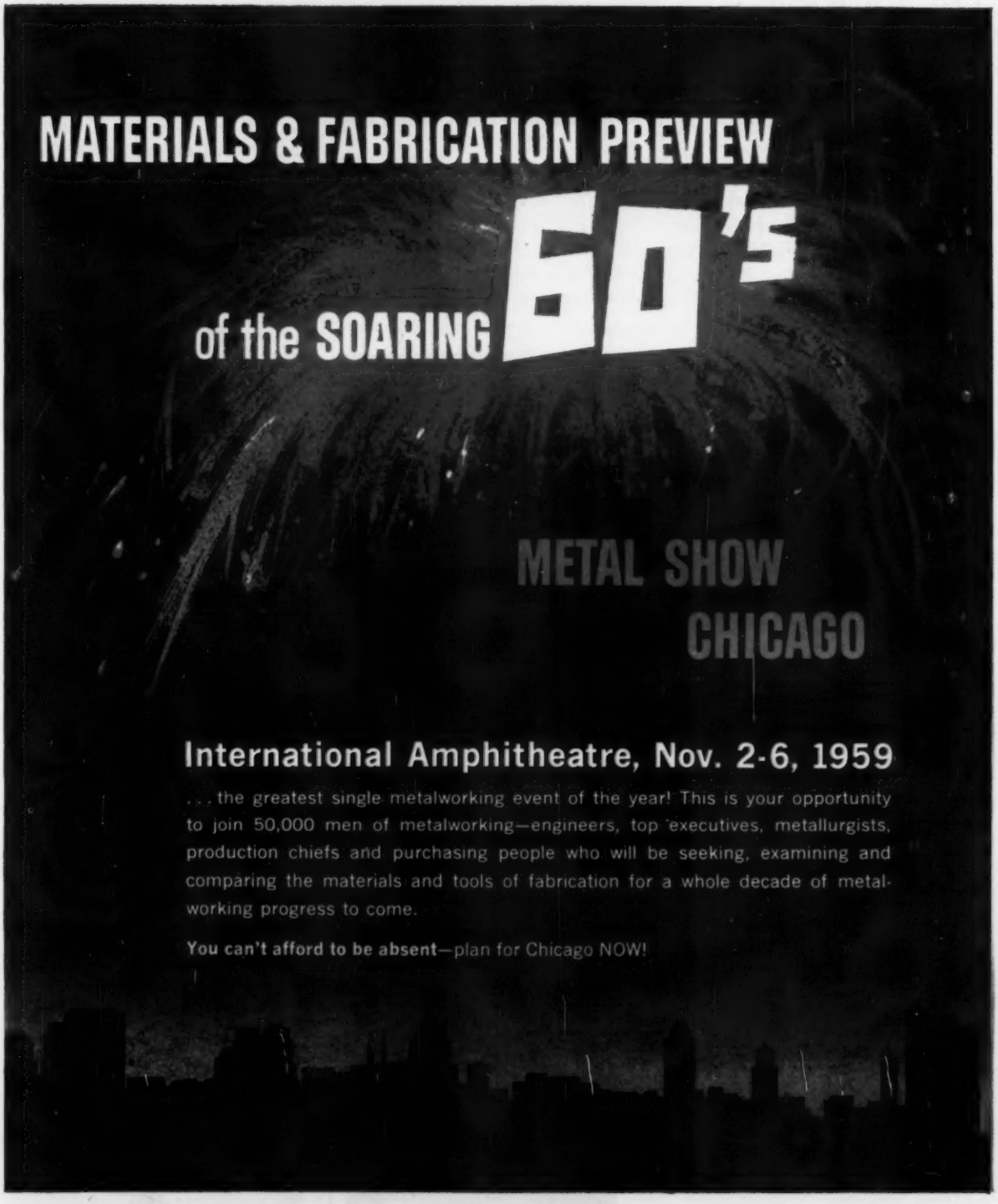


an electric limit switch at proper tube length. The machine will cut tubing from ¼ to ¾ in. diam. in lengths to 48 in. Production rates are high. (Special Machine Co.)

For more data circle No. 85 on postcard, p. 283

Low-Cost Miller

A vertical toolroom milling machine, with the range and capacity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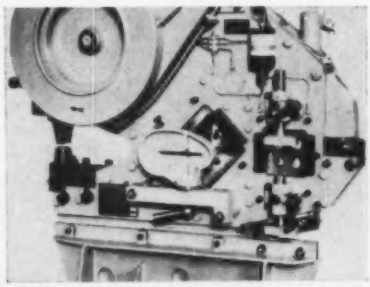
of larger mills, is priced very low. Equipped with a swivel head it is capable of angular as well as vertical operations. It has a 7 x 27-in. table, 16-in. longitudinal feed, 8-in. crossfeed, and 15-in. vertical feed, with ram movement of 12 in. Quill travel is 4 in. The quill uses a lead screw and nut arrangement for a feather feed that is particularly advantageous for precision boring. Six spindle speeds run from 250 to 3450 rpm, or 185 to 2550 rpm. (The U. S. Burke Machine Tool Div., Cincinnati Mfg. Corp.)

For more data circle No. 86 on postcard, p. 283

Iron Workers

SACMA Universal Iron Workers for five different operations, made by Orenstein & Koppel (German), feature five sizes with ⅜- to 1-in. shearing capacity. Of rugged design, they feature one-shot lubrication. Knives for cutting angles and T's are separate from knives for rounds and squares, and are mounted on independent slides. Knives for I-beams, U-channels, and Z-sections are quickly inter-

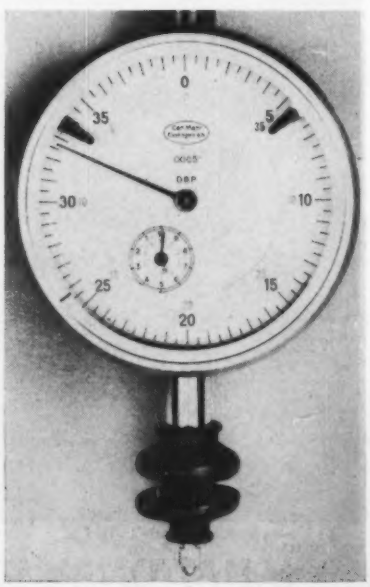


changed. Shearing blades and knives for rounds and squares are reversible and can be used in eight different positions. (Hermes Machine Tool Co., Inc.)

For more data circle No. 87 on postcard, p. 283

Waterproof Indicator

Completely protected against the entrance of oil, water, abrasive, or grit, a watertight dial indicator is ideally suited to use on grinders, lathes, boring mills, and other areas exposed to cutting fluids and abra-



sive dust. It is also shockproof. Zero adjustment is by a knurled knob. Measuring pressure is adjustable. Readings are in 0.0005-in. increments, with a total range of 0.400 in. (Mahr Gage Co. Inc.)

For more data circle No. 88 on postcard, p. 283

NEW PERFECTO-PEEN PROCESS

ONE GLASS-JET PROCESS PEENS, CLEANS, FINISHES and CUTS COSTS

Perfecto-Peening is a revolutionary new process of glass-jet peening using minute treated glass beads in a slurry solution . . . goes far beyond conventional peening. Perfecto-Peening not only cold works, stress relieves and increases fatigue life, it also cleans and improves metal surfaces down to fine finishes in its processes. Masking is never required down to and including a fine finish. No surface contamination, no imbedment, no residue. Removes flash, hinged and feather burrs, yet won't alter critical b/p dimensions even on delicate precision parts. Hundreds of peening, cleaning and finishing applications at reduced costs. Write or call us about your peening requirements and send a sample if you can.

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- Reduces cost of peening, cleaning and finishing.
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- Cleans and improves metal surfaces down to fine finishes, no masking required to and including these finishes. No imbedment, contamination, residue.
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- Removes flash, hinged and feather burrs . . . dimensional stability maintained.

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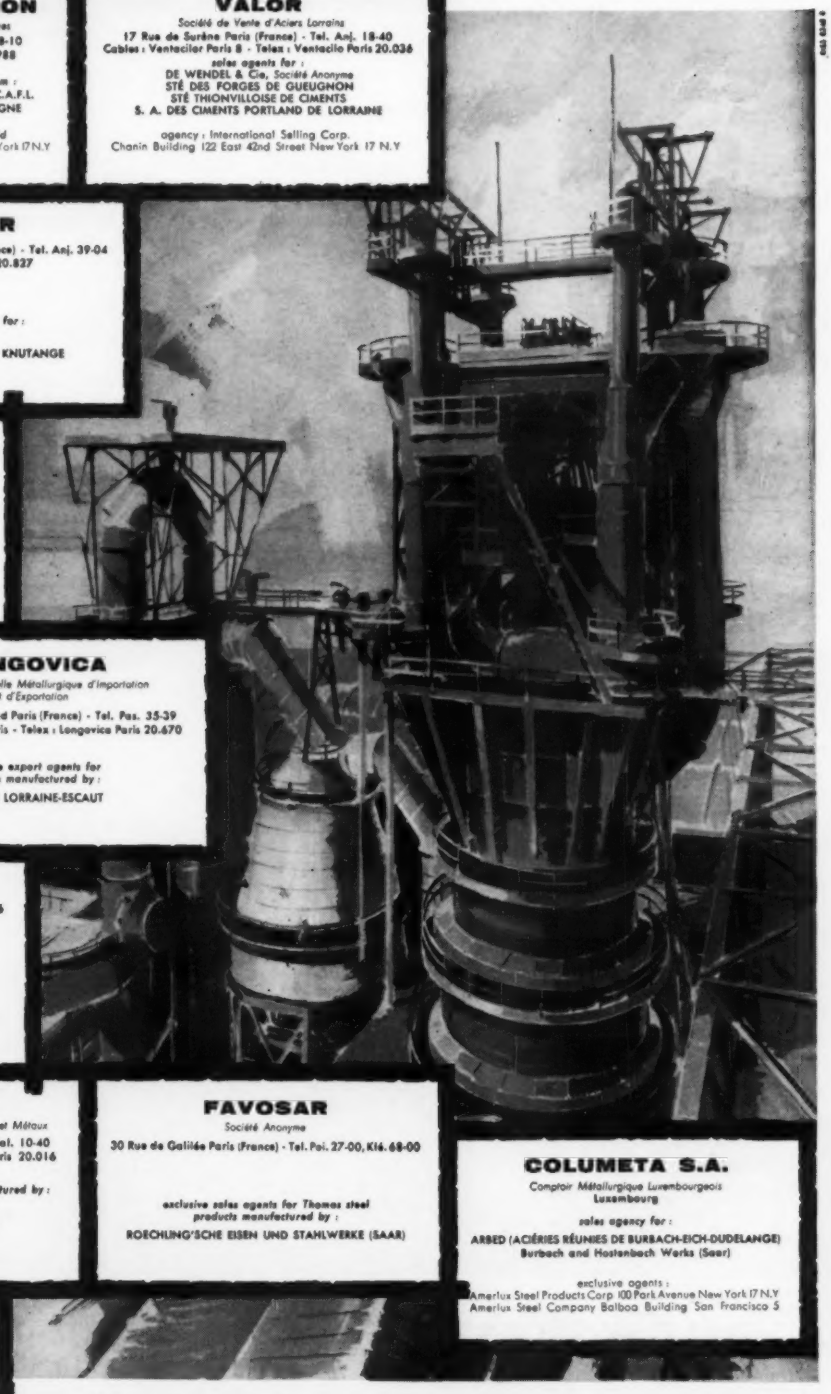

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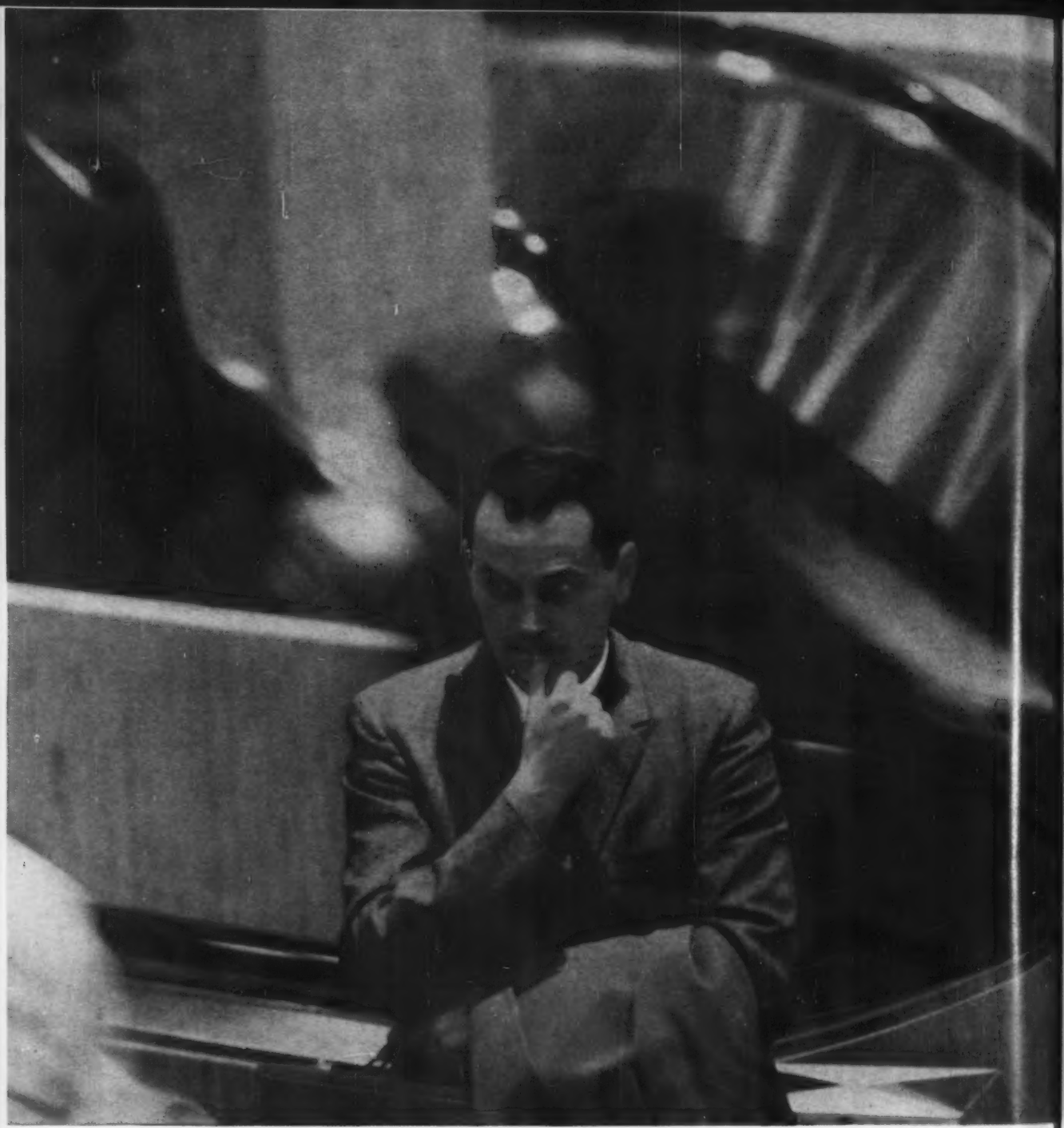

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Metal Show Comes To Chicago

Over 50,000 metals men will get together two weeks hence.

They'll have their choice of over 275 papers and 400 exhibits covering nearly every aspect of modern metalworking.

▪ The 41st American Society for Metals' National Metal Exposition and Congress will be held in Chicago, November 2 through 6, returning there for the 11th time since its inaugural there in 1919.

More than 275 technical presentations will be made in various sessions of the ASM and the seven cooperating groups, and the Exposition will include nearly 400 exhibitors.

Metals producers, fabricators, scientists, and engineers will attend and participate in the Metal Show, whose theme this year is "Materials and Fabrication Preview of the Soaring '60's."

Cooperating Societies — Seven other organizations will join with the ASM in technical and allied presentations. They are the American Institute of Mining, Metallurgical and Petroleum Engineers; Society for Nondestructive Testing; American Society for Testing Materials; Special Libraries Association; Ultrasonic Manufacturers Association; Metal Powder Industries Federation; and the Metal Treating Institute.

The many and varied technical sessions will be held Monday through Friday, Nov. 2 through 6. An ASM Seminar on Resonance and Relaxation will procede the show proper, on Oct. 31 and Nov. 1.

Hours for the Exposition in Chicago's International Amphitheatre are 10 a.m. to 6 p.m. Monday, Thursday, and Friday, and noon to 10 p.m. Tuesday and Wednesday.

The American Society for Testing Materials will meet in conference sessions. In addition, the Special Libraries Association has a program of papers and tours.

The formal Show program and a list of exhibitors follow.

PROGRAM INDEX:

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ASM Metals Engineering Conference.....**P. 252**
ASM Technical Papers.....**P. 254**
Society for Nondestructive Testing.....**P. 259**
Institute of Metals Div., AIME.....**P. 261**
Metal Treating Institute.....**P. 273**
Ultrasonic Manufacturers Assn. .....**P. 273**
Metal Powder Industries Federation.....**P. 273**

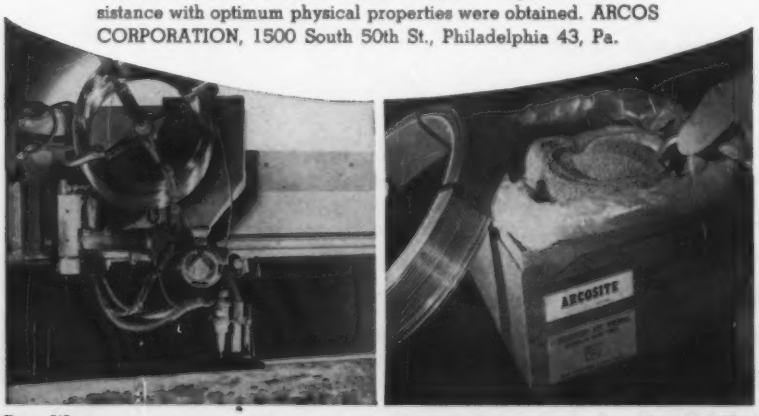
Job Report Courtesy of
Alco Products, Inc., Schenectady, N. Y.

Nuclear pressure vessel stainless clad at low cost

USE ARCOS

STAINLESS WIRE and BONDED FLUX

This "barrel" is one of several that comprise a nuclear pressurizer to operate under highly corrosive conditions. To reduce costs, Alco Products forged the shell of ASME A-336, 2—4 inch thick manganese molybdenum steel and clad the inside with stainless. The illustration shows the second pass overlay which was made by submerged arc using Arcos Chromenar K-LC (Type 308) bare wire and Arcosite S4 flux. Lower cost, and high corrosion resistance with optimum physical properties were obtained. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.



Bare Wire

Arcosite Flux

PROGRAM

AMERICAN SOCIETY FOR METALS

Pre-Show Seminar

RESONANCE AND RELAXATION IN METALS

All sessions in the Grand Ballroom of the Hotel Sherman.

Chairman: W. R. Hibbard, Jr., Manager, Alloy Studies Research, General Electric Research Laboratory, Schnectady

Sat., Oct. 31—9:00 a.m.

Session I

Chairman: Prof. J. N. Hobstetter

Acoustic and Magnetic Resonance

Cyclotron Resonance in Metals

Nuclear Resonance in Metals at Low Fields

—2:00 p.m.

Session II

Chairman: Dr. R. I. Jaffee

Ferromagnetic Resonance

The Relation of Metallic Bonding to Elastic Constants

Session III

Chairman: Prof. M. E. Fine

Dislocation Relaxation at High Frequencies

Kinetics of Decomposition of Alpha Prime in a Titanium-Copper Alloy

On the Aging Behavior of the Alloy Ti-6A1-4V

The Corrosion Behavior of Titanium-Palladium Alloy

—2:00 p.m.

HIGH STRENGTH STEELS

Chairmen: G. D. Ebeling, General Electric Co., Large Steam Turbine Dept., Schenectady; O. O. Miller, International Nickel Co., Research Laboratory, Bayonne, N. J.

Fatigue Properties of High

Strength Steels

The Influence of Pre-Existing Sharp Cracks on Brittle Fracture of a Ni Mo V Forging Steel

The Dimensional Stability of a Precision Ball Bearing Material

Effect of Deformation Prior to Transformation on the Mechanical Properties of 4340 Steel

The Strength of Martensite Formed from Cold-Worked Austenite

Sun., Nov. 1—9:00 a.m.

Session IV

Chairman: Prof. Morris Nicholson

Elastic Internal Friction Effects in Crystals & Dislocations

Large Amplitude Effects and Fatigue

Investigation of Radiation Damage Using Acoustics

—2:00 p.m.

Session V

Chairman: Dr. R. L. Smith

Stress Induced Atom Motion

Interaction of Conduction Electrons and Acoustic Waves

Investigations of Metallurgical Phenomena Through Elastic Constants

ASM-AEC SYMPOSIUM ON THE RARE EARTHS AND RELATED METALS

All sessions in the Bal Tabarin Room of the Hotel Sherman.

Mon., Nov. 2—9:00 a.m.

OCCURRENCE AND EXTRACTION OF RARE EARTHS

A. H. Daane and F. H. Spedding, Co-chairmen

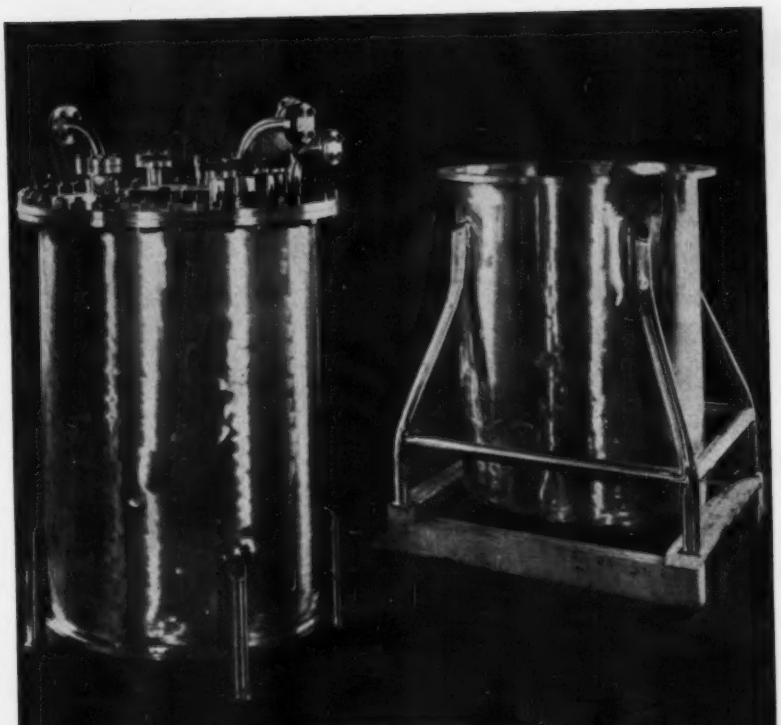
Opening Remarks

Introduction of Session

Historical Introduction to the Rare Earths

Chemistry of the Rare Earths

Occurrence and Strategic Supply of the Rare Earths



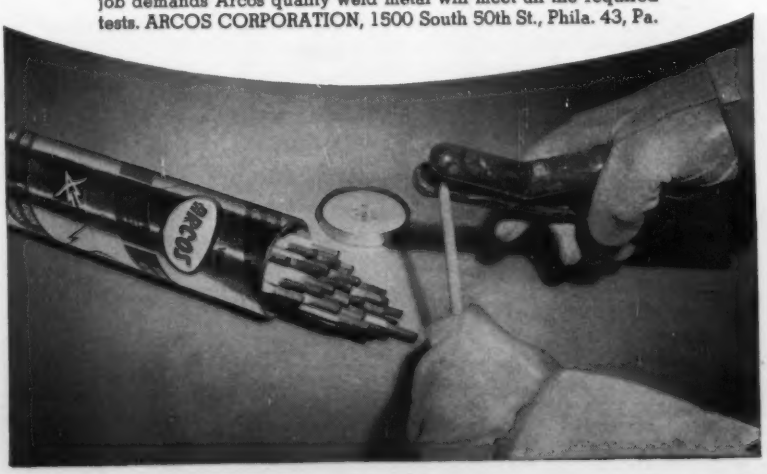
Job report courtesy of Superior Welding Company, Decatur, Ill.

How to get more *positive* results when Welding Stainless

WELD WITH ARCOS

STAINLESS ELECTRODES

These vessels—used for processing a chemical where utmost product cleanliness is required—were made of 304 ELC Stainless Plate and welded with Arcos Chromend 19-9 CB (347) electrodes. The fabricator selected these electrodes for the "right" analysis to resist corrosion and to assure a surface, including the weld areas that would take a high polish both on the inside and outside to make thorough cleaning easy. It's proof again that whatever the job demands Arcos quality weld metal will meet all the required tests. ARCOS CORPORATION, 1500 South 50th St., Phila. 43, Pa.



TUBULAR RIVET COST-SAVINGS MULTIPLY WITH MILFORD'S ASSEMBLY ANALYSIS

Smart production men know that a cleverly designed product that can't be assembled economically is worse than no product at all! Milford helps with a wealth of assembly tips.
For the answers to assembly problems . . .
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THE MILFORD RIVET & MACHINE CO.
MILFORD, CONNECTICUT • HATBORO, PENNA.
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PROGRAM

Separation of Rare Earths by Fractional Crystallization
Separation of Rare Earths by Liquid-Liquid Extraction
Separation of Rare Earths by Ion-Exchange

—2:00 p.m.

APPLICATIONS OF RARE-EARTH METALS AND COMPOUNDS

R. R. Nash and Jules Simmons, Co-chairmen

Non-Nuclear Applications of Rare Earths—Magnesium
Non-Nuclear Applications of Rare Earths—Ferrous and Other Light Metals
Non-Nuclear Applications of Rare Earths—Non-Metallic
Nuclear Applications
Analytical Chemistry of the Rare Earths
Analytical Spectroscopy of the Rare Earths

Tues., Nov. 3—9:00 a.m.

PREPARATION OF RARE EARTH METALS

H. E. Kremers and A. M. Gammill, Co-Chairmen

Halides for Metal Production—Fluorides
Halides for Metal Production—Chlorides, Bromides, Iodides
Metallothermic Preparation of Rare-Earth Metals
Metallothermic Preparation of Yttrium
Electrolytic Preparation of Rare-Earth Metals
Refining and Purification of Rare-Earth Metals
Mechanical Fabrication of Rare-Earth Metals

—2:00 p.m.

PROPERTIES OF RARE-EARTH METALS AND ALLOYS

B. Love and P. R. Kruesi, Co-Chairmen

Physical Properties of the Rare-Earth Metals
Crystallography of the Rare-Earth Metals
Metallography of the Rare-Earth Metals
Rare-Earth Metal Phase Diagrams
Principles of Alloying Behavior of Rare-Earth Metals
Mechanical Properties of Rare-Earth Metals
General Discussion

ASM METALS ENGINEERING PROGRAM COMMITTEE WILLIAM PARK WOODSIDE PANEL CONFERENCE

All sessions in the G. Bernard Shaw Room of the Hotel Sherman

Mon., Nov. 2—9:00 a.m.

COMPOSITE MATERIALS

Precision and Specialty Composite Metals
Vacuum Coated Composites
Clad Metals

—2:00 p.m.

COMPOSITE MATERIALS

Laminated Metal—Ceramic Composite Materials
Fiber Reinforced Metallic Composites
Metal Reinforced Ceramics
Vinyl-Coated Metals

Tues., Nov. 3—9:00 a.m.

EXPLOSIVE FORMING

Principles and Future of Explosive Forming
Adapting Explosive Forming to Production
Dies, Explosives and Energy Transmittal

—2:00 p.m.

EXPLOSIVE FORMING

Applicability and Range of Ap-

Photograph by famous underwater hunter-photographer Jim Thorne

DEEP SEA HUNTER FAILS TO FLAKE INLAND TI-CO®

More than a match for ferocious 700-pound hammerhead sharks, this compressed-air powered gun fires underwater spears with terrific force. Again and again its high-speed missiles pierced this Inland TI-CO galvanized sheet, yet at the edges around the holes there wasn't a trace of flaking of the zinc coating.

Yes, you can perforate TI-CO sheets. You can subject them to deep-drawing, spin-drawing, punching, crimping, Pittsburgh lock-seaming, in fact the toughest fabricating processes—*but you won't flake TI-CO!*

No wonder TI-CO galvanized sheets are top-choice with manufacturers in such a wide variety of new applications and products. TI-CO is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in gages 8 to 30 inclusive and in widths as great as 60 inches. Specifications, application and performance data, complete information, is all contained in a free TI-CO booklet we'll be glad to send at your request. For your galvanized sheet or coils requirements, consult your Inland representative.

Close-up inspection shows no flaking of TI-CO's zinc coating

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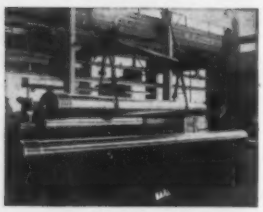

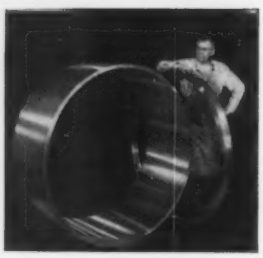

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Your machine parts, ferrous or non-ferrous, are subject to stress, strain and friction, day after day, year after year . . . so specify Shenango . . . and see what a difference this makes!

Shenango's centrifugal casting process insures longer life because of finer, more uniform, *pressure-dense* grain to begin with . . . free of inclusions, porosity, blowholes and other weakening defects. Then, far less machining is needed and your part is stronger . . . to last and last *and last!*

Shenango's modern and fully-equipped shops will supply you with ferrous or non-ferrous symmetrical parts in virtually any shape or size . . . rough, semi-machined or precision-finished to your most exacting specifications. For full details, write: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

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PROGRAM

plications of the Process (Panel Session)

Wed., Nov. 4—2:00 p.m.

Beryllium
Vanadium
Columbium

Thurs., Nov. 5—9:00 a.m.

NEW MATERIALS AND FABRICATION TECHNIQUES

Foamed Metals

Delrin, A Plastic With Metal-Like Properties

—2:00 p.m.

Foaming and Fabrication of Yttrium Metal

Electron Beam Melting, Welding and Ingot Conditioning

ASM TECHNICAL PAPERS

Mon., Nov. 2—9:00 a.m.

Hotel Sherman — Louis XVI Room

STEEL I

Chairmen: G. H. Enzian, Jones & Laughlin Steel Corp., Pittsburgh; W. T. Lankford, U. S. Steel Applied Research Laboratory, Monroeville, Pa.

Effect of Cold Work on Temper Brittleness

Influence of Static Stress and Temperature on Internal Damping

Correlation Between Internal Friction and Temper Brittleness in Steel

Gas-Metal Reactions During Box Annealing of Low-Carbon Steel

The Importance of Directionality in Drawing Quality Sheet Steel

—9:00 a.m.

Hotel Sherman—Assembly Room

TITANIUM

Chairmen: P. D. Frost, Battelle Memorial Institute, Columbus, O.; Harold Margolin, New York Uni-

versity College of Engineering

Anomalous Effect of Hydrogen on the Mechanical Properties of Ti-8 Mn Alloy

Supersaturation as a Factor in the Hydrogen Embrittlement of Titanium Alloys

Diffusion of Oxygen in Alpha and Beta Titanium

Kinetics of Decomposition of Alpha Prime in a Titanium-Copper Alloy

On the Aging Behavior of the Alloy Ti-6A1-4V

The Corrosion Behavior of Titanium-Palladium Alloy

—2:00 p.m.

Hotel Sherman—Louis XVI Room

HIGH STRENGTH STEELS

Chairmen: G. D. Ebeling, General Electric Co., Large Steam Turbine Dept., Schenectady, N. Y.; O. O. Miller, International Nickel Co., Research Laboratory, Bayonne, N. J.

Fatigue Properties of High Strength Steels

The Influence of Pre-Existing Sharp Cracks on Brittle Fracture of a Ni Mo V Forging Steel

The Dimensional Stability of a Precision Ball Bearing Material

Effect of Deformation Prior to Transformation on the Mechanical Properties of 4340 Steel

The Strength of Martensite Formed from Cold-Worked Austenite

Tues., Nov. 3—9:00 a.m.

Hotel Sherman — Louis XVI Room

STEEL II

Chairmen: Morris Cohen, Massachusetts Institute of Technology, Cambridge, Mass.; S. L. Gertsman, Dept. of Mines and Technical Surveys, Ottawa

Effect of Austenitizing, Tempering, and Microstructure on the Properties of a Cr-Mo-V Steel

Effect of Cooling Rate from Ms Temperature to Room Temperature

ATLAS all-steel

TURNTABLES

BALL BEARING MOUNTED

FLAT-TOP

Checkered safety top with or without latches. Standard to 96" diameter.

P-2777

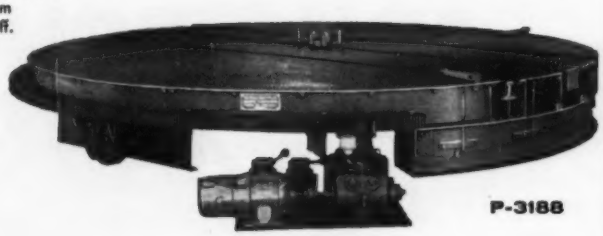
FLUSH RAIL

Single or crossed track models, with latches and pit ring. Standard to 96" diameter. Also available with raised rails.

P-2805

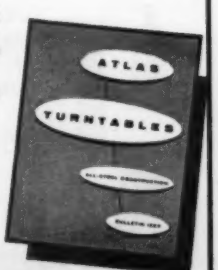
POWER-OPERATED

30-ton flush-rail, 16-foot diameter turntable designed for 90° power rotation. Power-operated mechanism moves cars on and off.



P-3188

Atlas welded, all-steel turntables are stronger, cost less than cast units. Standard sizes available to 96" diameter, but can be provided to any required size and capacity. New adjustable center bearing design reduces load on outer ball bearing raceways, greatly reducing effort needed to turn tables.



Request turntable bulletin for detail.

ATLAS CAR & MFG. CO.

1140 Ivanhoe Rd., Cleveland 10, Ohio

PROGRAM

on Magnetic Properties of 3.5% Chromium Magnet Steel

Tensile Properties of Copper-Bearing Low-Carbon Steel

Retained Austenite in Precipitation Hardening Stainless Steels

—9:00 a.m.

Hotel Sherman—Assembly Room

CREEP
AND DEFORMATION

Chairmen: David Krashes, Worcester Polytechnic Institute, Worcester, Mass.; K. M. Karlsen, Jones & Laughlin Steel Corp., Graham Research Laboratory, Pittsburgh.

Effect of Stress on the Creep of Aluminum in the Dislocation Climb Range

Experimental Survey of the Deformation of the Hard-Ductile Two-Phase Alloy System WC-Co

Directional Grain Structures for High Temperature Strength

Activation Energies for Creep of an Alpha Solid Solution of Magnesium in Aluminum

—2:00 p.m.

Hotel Sherman — Louis XVI Room

PHYSICAL METALLURGY

Chairmen: R. A. Swalin, University of Minnesota, Minneapolis; W. R. Upthegrove, University of Oklahoma School of Metallurgical Engineering, Norman, Okla.

A Study of the Relationship Between State of Aging and Notch-Fatigue Performance of a High-Strength Aluminum Alloy

Precipitation Process in Copper-Chromium Alloys

The Effect of Trace Elements on the Tensile, Electrical Resistance, and Recrystallization Properties of High Purity Nickel

The Thermal and Electrical Conductivities of Ductile Cast Iron and Several Gray Cast Irons

ARMSTRONG
SET-UP
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TOOLS
ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents. Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.
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An Investigation of Aluminum-Copper Composites Prepared by Solid-State Bonding

Substructure Characteristics of Fine-Grained Metals and Alloys Disclosed by X-Ray Reflection Microscopy and Diffraction Analysis

Wed., Nov. 4—2:00 p.m.

Hotel Sherman — Louis XVI Room

MECHANICAL WORKING

Chairman: E. M. Mahla, Pigments Dept., E. I. duPont de Nemours & Co., Experimental Station, Wilmington, Del.

The Effect of Rolling Variables on the Hot Rolling of Titanium & Titanium Alloys

The Effect of Initial Increments of Hot Working on the Mechanical Properties of Certain Ferrous Materials

The Thermo-Mechanical Method for Relieving Residual Quenching Stresses in Aluminum Alloys

Calculation of Rolling Forces Using the Orowan Theory

The Effect of Selenium on the Machinability and Tensile Properties of Five Per Cent Chromium Steel

Thurs., Nov. 5—9:00 a.m.

Hotel Sherman — Louis XVI Room

NUCLEAR METALS

Chairmen: W. W. Martin, Los Alamos Scientific Laboratory, Los Alamos, N.M.; E. C. Miller, Oak Ridge National Laboratory, Oak Ridge, Tenn.

High Strength Zirconium Alloys

The Effect of Uranium Hydride Distribution and Recrystallization on the Tensile Properties of Uranium

Textures in Extruded Uranium

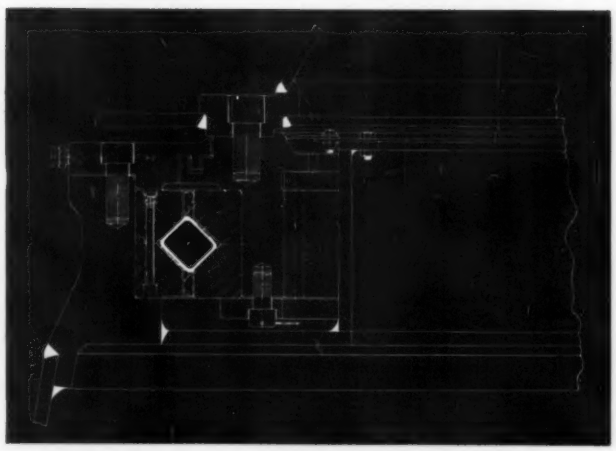
Transformation Kinetics and Mechanical Properties of Uranium —0.5 w/o Columbium—0.5 w/o Molybdenum Alloy

Metallographic Study of String-

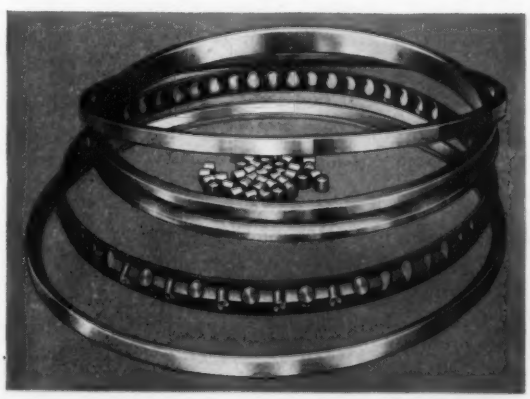
THE "X" BEARING...

Culmination of MESSINGER *Pioneering of* CYLINDRICAL ROLLER BEARING *Design*

Nearly fifty years ago Messinger began the design and manufacture of Cylindrical Roller Bearings of the Integral Gear type. Proof of their outstanding success is found in the long reliable service they have provided throughout the years, and the consistent growth in demand for them from all branches of industry. Ability to carry heaviest loads in minimum space with less weight; and greatly improved efficiency and lower manufacturing costs of the machinery or equipment in which they are employed, are important reasons for their extensive use today.



97" Diameter "X" Bearing Applied to Radar Mount.



The Versatile "X" BEARING represents fulfillment of this phase of Messinger pioneering and development. It takes thrust load in either direction, with radial load and overturning moment, and can be designed to take them all at one time. Each bearing does the work of three ordinary bearings... with vital savings in space and weight, and the assurance of much longer service life. It can be readily adapted to the widest variety of applications because of its versatile dimensional range... from pocket size to twelve feet and over. Thousands are in service wherever critical and enduring accuracy is of paramount importance.

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Talk with MESSINGER engineers about its BEARINGS now. No obligation.

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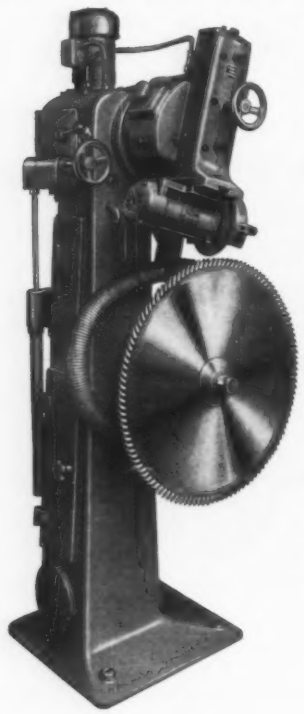
BALL AND ROLLER BEARINGS • FEATHERWEIGHT TO HEAVYWEIGHT

WAGNER

AUTOMATIC GEAR INDEXING SAW BLADE SHARPENER



The new WAGNER Saw Sharpening Machine Type LT, with automatic indexing drive, rapidly sharpens circular saw blades from 10-inch to 52-inch diameter with accurate tooth spacing. A cam control accurately generates the correct tooth form. Spindle, indexing, and exhaust have direct motor drive.

Two index plate type models also available:

Model LS—10" to 52" capacity

Model MS—12" to 72" capacity

Write for Catalog #51

Segmental Saw Blades

WAGNER, with more than 66 years experience, is qualfiied to produce the right saw blade for your job. Segmental blades are available in diameters from 8 to 71 inches. Maximum cutting efficiency and exceptionally long service are assured with the original WAGNER tooth form.

Segments of finely tempered, high speed steel are accurately fitted to the heat-treated alloy steel saw discs. Overlapping type segments form a rigid crown and thereby provide maximum strength and protection for the saw disc. For more information, write for Circular #50.

Albert

KLINGELHOFER

MACHINE TOOL CORP.

Kenilworth, New Jersey

PROGRAM

ers in Inert Atmosphere-Melted Zircaloy-2

—9:00 a.m.

Hotel Sherman—Assembly Room

AUSTENITIC ALLOYS

Chairmen: W. O. Harms, University of Tennessee, Knoxville, Tenn.; S. W. Poole, Republic Steel Corp., Titanium Research, Canton, O.

Some Metallurgical Factors Affecting Stress Corrosion Cracking of Austenitic Stainless Steels

The Tensile and Yield Strength of Cr-Mn-N Steels at Low Temperatures

Effect of Interstitial Carbon Plus Nitrogen and Precipitation Reactions on the Properties of Austenitic Cr-Mn-C-N Steels

The Role of Boron in Cast Austenitic Alloys

Structure and Properties of Austenitic Alloys Containing Aluminum and Silicon

Development of a Ferromagnetic Cobalt-Base High Temperature Alloy

—2:00 p.m.

Hotel Sherman — Louis XVI Room

REFRACTORY METALS

Chairmen: H. H. Chiswip, Metallurgical Div., Argonne National Laboratory, Lemont, Ill.; C. T. Sims, Knolls Atomic Power Laboratory, General Electric Co., Schenectady

Properties of Refractory Alloys Containing Rhenium

The Flow, Fracture, and Twinning of Commercially Pure Vanadium

An Exploration of High Boron Alloys

Columbium-Oxygen System

The High-Temperature Oxidation of Tungsten-Columbium Alloys

SOCIETY FOR NONDESTRUCTIVE TESTING

All sessions in Ballroom, Hotel Hamilton, except Nov. 4 luncheon, which is in the Minor Room, Hotel Hamilton.

Mon., Nov. 2—9:00 a.m.

NEW INSTRUMENTATION AND TECHNIQUES

Reliability and Nondestructive Testing (Convention Theme Paper —Invited)

A Nondestructive Method to Detect Pipes and Cavities in Hot Steel Blooms During the Rolling Process by Means of Betatron, X-Ray Image Intensifier and Television Setup

Automatic Processing in Industrial Radiography

Radiography With the Electron Linear Accelerator

Report on "ADC"—A new Technique for Improving Accuracy of Eddy Current Flaw Detectors

Three Years' Experience In Industrial Application of the 31 Mev Brown Boveri Dual Beam Betatron for Nondestructive Testing

—2:00 p.m.

NEW INSTRUMENTATION AND TECHNIQUES

Use of Beta X-Ray in Nondestructive Testing

Portable Spectrograph

Radiography With Kilocurie Cobalt 60 Sources

Frequency Dependent Effects in Ultrasonic Resonance Testing

Utilization of Electrical Conductivity as a Nondestructive Tool

Tues., Nov. 3—9:00 a.m.

NONDESTRUCTIVE TESTING CORRELATION WITH FATIGUE TESTING

Establishing Acceptance Standards Through Rig Testing

Analytical Approach to the Study of the Effect of Small Cavities on Fatigue Strength

Effect of Discontinuities on the

OSBORN®

BEFORE BRUSHING

Corners of intricate multiple contours were hand-filed to remove burrs. Results were inconsistent. Former production rate: **24** *per hour.*

AFTER BRUSHING

All surface junctures are blended accurately to predetermined specifications. Results are uniform...quality is high. Osborn 3-A Machine production rate: **63** *per hour.*

Production up 62% on this finishing job

...with OSBORN power brushing

PUSH-BUTTON FINISHING OPERATION . . . *with Osborn 3-A Machine using Osborn Economy® Wire Brushes. Operator simply loads part...starts pre-set brushing cycle... and unloads part after brushing.*

Formerly, this air conditioner manufacturer finished 24 compressor bodies per hour. He now finishes 63 per hour . . . *a 62% increase in production.* But that's just the start.

Quality now is uniform because Osborn power brushing thoroughly removes all burrs that might ultimately damage the compressor. Each surface juncture of the intricate contour is also formed to an exacting, predetermined blend . . . all automatically.

Your Osborn Brushing Analyst will gladly provide complete details. He will show how you can benefit on similar operations in your own plant.

Write now for full details on Osborn Metal Finishing Machines. *The Osborn Manufacturing Company, Department F-88, Cleveland 14, Ohio.*

Osborn Brushes

METAL FINISHING MACHINES... AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

for profitable short run production . . .

the **STRIPPIT**

FABRICATOR

WORK PIECE – Electronic Chassis — 10" x 14" — 23 holes — 5 sizes — 4 different shapes — 4 corner notches

SETUP TIME – 9.3 minutes

PRODUCTION RUN – 5 pieces

PRODUCTION TIME PER PIECE – 2.8 minutes

For short or pilot runs—model shop and experimental work—no other single machine can match the production capabilities and profit potential of the Strippit Fabricator.

PUNCHES—any round or shaped hole up to 3½" diameter in sheet material — up to ¼" mild steel.

NOTCHES—90° corners — rectangular, radii, vee and special shape edge notches — up to ⅛" capacity in mild steel.

NIBBLES—straight line or contour shearing up to a 38" diameter circle, at 165 strokes per minute, ⅛" mild steel.

ACCURATE, QUICK-SET GAUGING—a unique, multiple-stop system permits exact positioning of the work to any layout specifications in seconds instead of minutes.

QUICK-CHANGE PUNCHES AND DIES—changed from one size to another in less than 20 seconds — within easy reach in labeled, built-in file drawers.

EASY CONVERSION—to a production punching unit by adding the Strippit Duplicator for high speed production of hundreds of pieces — and the Dupl-O-Scope to punch Duplicator templates from a drawing, layout or sample part.

WRITE TODAY—for Catalog 10 AA and an actual demonstration right at your own plant of the capabilities of this high-profit fabrication system, by a Strippit Mobile Demonstration Unit.

WALES STRIPPIT INC.

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In Canada: Strippit Tool & Machine Company, Brampton, Ontario

PROGRAM

Fatigue Strength of 7075-T6 Tin-Loaded Lugs

—2:00 p.m.

COMPONENT RELIABILITY

Automatic Inspection of Jet Rotors

Radiographic Inspection of Sealed Electronic Components

Nondestructive Testing of Large Solid Propellant, Case Bonded Rocket Motors

Glueline Thickness Measurements by Eddy Current Inspection

An Evaluation of Coating Thickness Testing Methods

Wed., Nov. 4—9:00 a.m.

NUCLEAR COMPONENT RELIABILITY

Automatic Cladding Thickness and Bonding Tester for Reactor Fuel Elements

A Through Transmission System Using Pulsed Eddy Currents

Inductive Thermometry

Automatic Particle Size Determination from Microradiographs

Studies in Broadband Eddy Current Testing

—12 Noon

SNT LUNCHEON

The Human Skeletal System, A Nonstandard Product

—2:15 p.m.

THE LESTER HONOR LECTURE

The Nondestructive Testing Engineer — Today's Career Opportunity

Presentation of the DeForest Award

Presentation of the Collidge Award

Thurs., Nov. 5—9:00 a.m.

COMPONENT RELIABILITY

Radiographic Technique at 250 KVP

Nondestructive Testing Techniques for Components of Critical Anti-Friction Bearings

Recent Advances in Ultrasonic Research and Development

Flaw Detection and Bond Testing with Ultrasonic Recorder

Ultrasonic Inspection—Its Present and Future Status

—2.00 p.m.

PROBLEMS FACING THE AIRCRAFT INDUSTRY IN THE INSPECTION OF BRAZED HONEYCOMB STRUCTURES

Panel

Fri., Nov. 6—9:00 a.m.

EDUCATIONAL CLINIC

Welcome

Orientation, Scope of Present NDT Field

Radiography, Including Isotope Radiography

Darkroom Techniques

Fluoroscopy

Magnetic Particle Inspection

—1:30 p.m.

EDUCATIONAL CLINIC

Penetrant Inspection

Eddy Current Test Methods

Ultrasonic Theory and Instrumentation

Ultrasonics Applications and Interpretations

Writing in Modern Technology

THE METALLURGICAL SOCIETY, Institute of Metals Division

AMERICAN INSTITUTE OF MINING, Metallurgical and Petroleum Engineers

Mon., Nov. 2

All meetings in Morrison Hotel

9:00 a.m.—Ballroom

SYMPOSIUM ON KINETICS OF PHASE TRANSFORMATIONS

Kinetics of Martensitic Transformations

Kinetics of Ordering

Kinetics of Precipitation

9:00 a.m.—Constitution Room

SYMPOSIUM ON PREPARATION, PURIFICATION, AND PROPERTIES OF REFRACTORY METALS

Electron Beam Melting of Refractory Metals

Shape Casting of Molybdenum

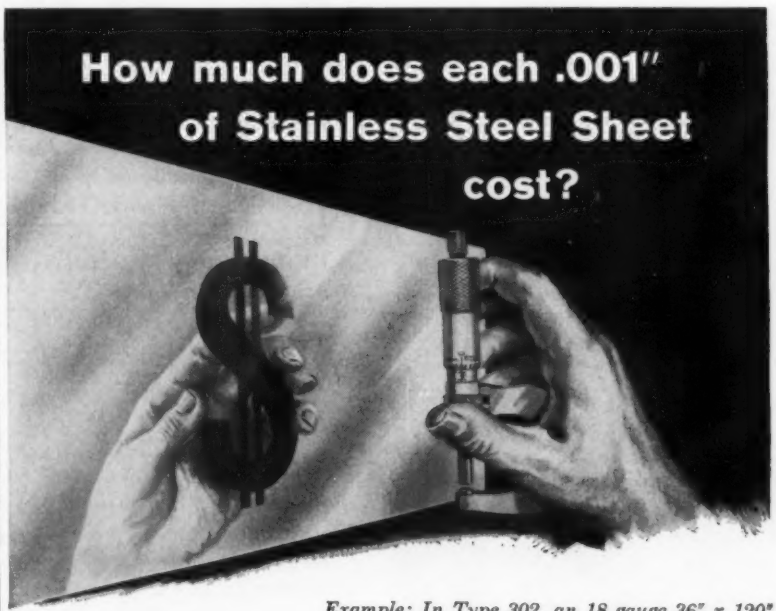
Purification Reactions of Tantalum During Vacuum Sintering

Study of Consumable Arc Melting of Two High Strength Oxidation-Resistant Columbium-Base Alloys

9:00 a.m.—Cotillion Room

DIFFUSION

Self-Diffusion in Alpha Iron



Example: In Type 302, an 18 gauge 36" x 120" sheet has a base price of 52¢ per pound. In sheets of this size, each .001" of thickness weighs 1.26 pounds per sheet. Thus, each .001" of unnecessary thickness costs you at least 65.5¢ more per sheet.

On the surface this may seem insignificant, but it has a marked effect on the total price you pay for a given quantity of stainless steel sheet. With cost a factor, this can be important since stainless steel is purchased by weight.

Using the above example, a mere .001" of unnecessary thickness costs you $20.76 more per ton. If you figure the maximum allowable gauge thickness variation of plus or minus (10%), you can readily see that the price you pay for overall sheet thickness could involve much needless cost.

Washington Steel has the equipment and the experience to produce MICRO-ROLD stainless steel to tolerances much closer than standard industry tolerances. Usually money can be saved by first selecting the minimum gauge that will serve the requirements of the application, and then specifying that the thickness be rolled to the light side of the gauge range. This specification involves no cost extra and is standard practice at Washington Steel. (If exact close tolerances must be guaranteed, there is a nominal additional charge.)

Consult your nearest MicroRold Stainless Steel Distributor. He will gladly show you how to save money on your stainless steel purchases.

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PROGRAM

Diffusivity of Hydrogen in Alpha Iron

Solubility and Diffusivity of Hydrogen in Iron

Thermal Diffusion of Carbon in Alpha and Gamma Iron

Determinations of the Self-Diffusion of Chromium and the Diffusion of Chromium in Binary Iron-Chromium Alloys by the Autoradiographic Techniques

Electron Microprobe Measurements of the Diffusion of Columbium into Iron, Nickel, Chromium, Molybdenum, and Stainless Steels at Elevated Temperatures

Diffusion of Uranium and Aluminum-Silicon Eutectic Alloy

Prediction of Electric Mobilities in Molten Alloys

On the Theory of Self-Diffusion in Liquid Metals

Study of Solute Diffusion in Liquid Tin

9:00 a.m.—Embassy Room

METAL PROCESSING

Progressive Solidification Study for Vacuum Cold Hearth Melting

Directional Freezing of Magnesium Alloys

A Comparison of Arc-Melting Conditions and Their Effects on Reactor-Grade Zirconium Alloy Ingots

Use of Vibration in the Solidification of High Temperature Alloys for Refractory Metals

An Effect of Ultrasonic Irradiation During Ingot Solidification

A Study of Melting Procedures as Related to Ingot Solidification

An Investigation of Metal Spinning

A New Method for Determining the Drawing Quality of a Sheet by Use of the Hydraulic Bulge Tester

A New Method for Compacting Metal Powders Into Continuous Sections

2:00 p.m.—Ballroom

A Variational Principle for the Description of Complex Metallurgical Transformations

Further Studies of GPI Zone Formation in Al-2 at pct Cu

Aging Characteristics of Cu-Ti Alloys

Phase Transformation in Nickel-Rich Nickel Titanium-Aluminum Alloy

Comparison of the Thermal Stability of Some Precipitation-Hardened and Dispersion - Hardened Nickel-Base Alloys

A Study of the Transformation Kinetics of Alpha, Beta, and Gamma Plutonium

Hardening By Internal Oxidation as a Function of Velocity of the Oxidation Boundary

The Growth Rate of Bainite

Influence of Solution Annealing Treatment Upon Transformation Kinetics in Titanium-Chromium Alloys

Effect of Stresses on the Ordering Transformation in AuCu Alloy

Hall Coefficient Changes During Ordering of Cu_3Au

2:00 p.m.—Constitution Room

SYMPOSIUM ON PREPARATION, PURIFICATION, AND PROPERTIES OF REFRACTORY METALS

Deformation Behavior of Zone-Melted Tungsten Single Crystals

Mechanical Properties of Tantalum Metal Consolidated by Melting

Columbium - Oxygen Reactions from 450 to 1200°C

Reaction of Pure Tantalum with Nitrogen, Oxygen, and Air

2:00 p.m.—Cotillion Room

CREEP AND FATIGUE

Effect of Stress on the Creep Rate of a Mg Single Crystal at 78 to 364°K

On the Origin of Tertiary Creep in an Aluminum Alloy

Effect of Dilute Copper Alloying on the Activation Energies for Creep of Aluminum Single Crystals

Creep of a Recrystallized Aluminum SAP-Type Alloy

Investigation of Static and Fatigue Strength of Metals Subjected to Triaxial Stresses

Creep-Rupture Properties of Al-

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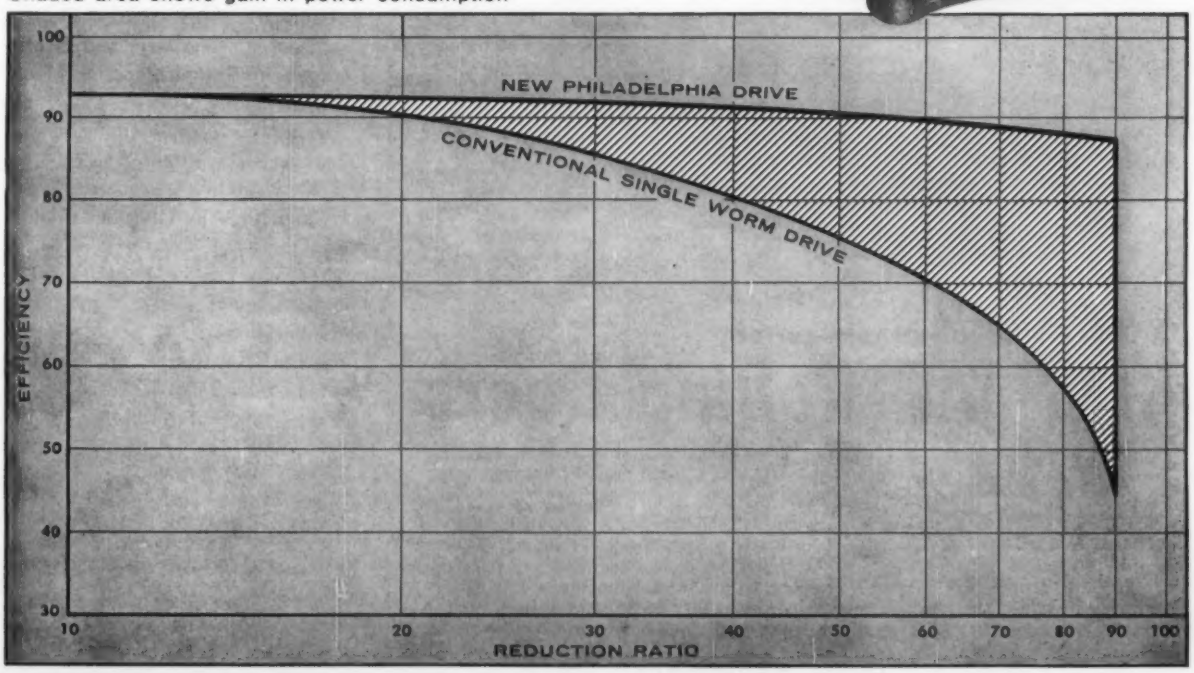

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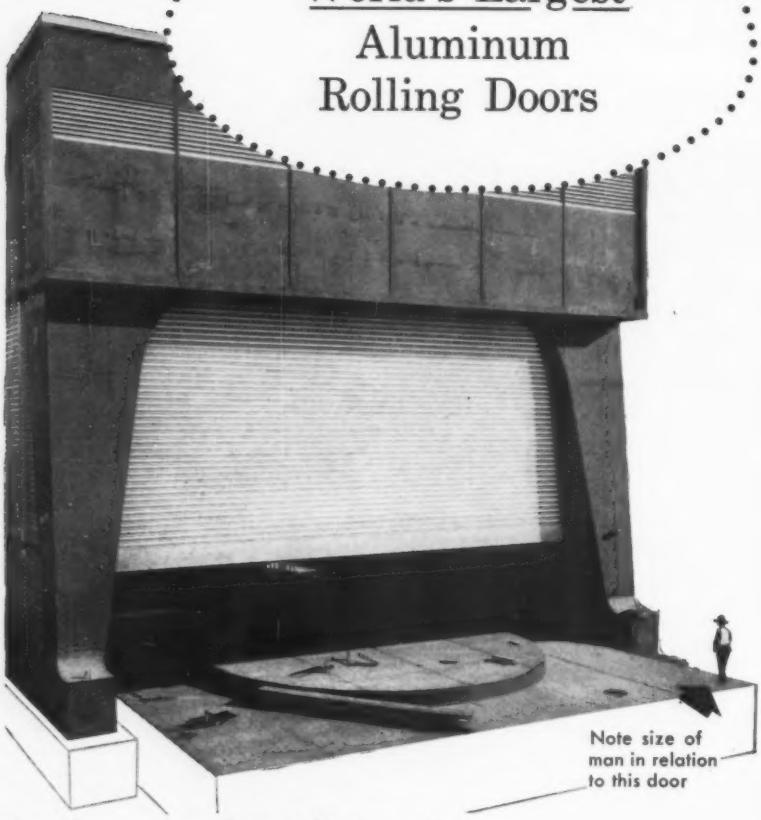

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PROGRAM

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High Temperature Fatigue in Air and in Vacuum

Crack Propagation in Air and in Vacuum

On the Damping and Fatigue Properties of High-Purity Aluminum

A Metallographic Study of Fatigue in High Purity Aluminum

2:00 p.m.—Embassy Room

THERMODYNAMIC AND PHYSICAL PROPERTIES

Close-Packed Ordered Structures in Binary AB-Alloys of Transition Elements

Crystal Structure of MoNi

Application of Gibbs - Duhem Equations to Ternary and Multi-Component Systems

Mg-Fe System

Uranium - Molybdenum Phase Diagram Below 900°

Transformation Temperatures and Structures in Uranium-Fissium Alloys

Precision Lattice Parameter Determinations of Zirconium-Oxygen Solid Solutions

Lattice Expansion of Rhenium and Titanium

Propagation of Sound in Liquid Alloys, the Mercury-Thallium System

Influence of Lattice Defects on the Transition from the Superconducting to the Normal State of Tantalum

Superconducting Properties of Dilute Interstitial Alloys of Tantalum with Hydrogen, Nitrogen, and Oxygen

Tues., Nov. 3

9:00 a.m.—Ballroom

SYMPOSIUM ON MECHANICAL PROPERTIES OF NON-METALS

Mechanical Properties of Covalent Crystals

Mechanical Properties of Polymeric Materials

Mechanical Properties of Ionic Crystals

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9:00 a.m.—Constitution Room

SYMPOSIUM—
TITANIUM VS. STEEL

Introduction
The General Case, Titanium
Steel
Airframes, Titanium
Steel
Jet Engines, Titanium
Steel

9:00 a.m.—Cotillion Room

RECENT ADVANCES IN STEELMAKING

Program To Be Announced

9:00 a.m.—Embassy Room

SYMPOSIUM ON PREPARATION, PURIFICATION, AND PROPERTIES OF REFRACTORY METALS

Tin Reduction of Molybdenite

Molybdenum by Direct Thermal Dissociation of Molybdenum Disulfide

Tantalum Metal by Selective Solution

Production and Purification of High-Purity Hafnium Metal

2:00 p.m.—Ballroom

PROPERTIES OF NON-METALS

Dislocation Multiplication in LiF Crystals

Dislocations in Indented Magnesium Oxide Crystals

Dislocation Arrangements in Sodium Chloride Single Crystals

NaCl Embrittlement by Surface Compound Formation

Effect of Grain Size on the Deformation of Polycrystalline Silver Chloride at Various Temperatures

Kinetics of Sintering of Sodium Chloride in the Presence of an Inert Gas

Preparation and Electrical Resistivity of Boron and Some Boron-Phosphorus Alloys

Diffusion of Lead in Single Crystals of Lead Selenide

Diffusion of Lead in Single Crystals of Lead Sulfide

Effect of Annealing, Strain Rate, and Size of the Stress-Strain Char-

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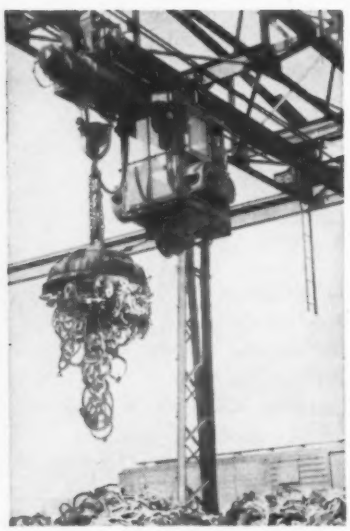

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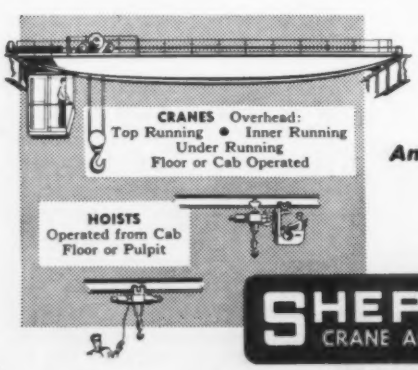

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PROGRAM

acteristics of Lithium Fluoride Single Crystals

2:00 p.m.—Constitution Room

SYMPOSIUM—TITANIUM VS. STEEL

Pressure Bottles, Titanium
Steel
Solid Fuel Motor Cases, Titanium
Steel
Marine and Chemical Plant, Titanium
Other Materials

2:00 p.m.—Cotillion Room

RECENT ADVANCES IN STEELMAKING

Program To Be Announced

2:00 p.m.—Embassy Room

SYMPOSIUM ON REFINING OF PURE METALS

High-Purity Single Crystals of Indium Antimonide
Zone Refining of Reactive Metals
Electron Beam Floating Zone Melting of Platinum Group Metals

Wed., Nov. 4

9:00 a.m.—Ballroom

SYMPOSIUM ON IRRADIATION ON FUEL AND FUEL ELEMENTS

Fundamentals of Fission Damage
A Discussion of the Variables Affecting the In-Pile Behavior of Fuel Materials
Swelling and Fission Gas Agglomeration in Metal Fuels
Fundamentals of Inert Gas Agglomeration and Swelling in Metals
Operational Performance of Bonded and Unbonded Uranium Fuel Rods
Irradiation Behavior of U-FS and U-PU-FS Fast Reactor Fuels
Irradiation Behavior of U-Cb and U-Cb-Zr Alloys
Crystallographic Study of Radiation-Induced Recovery in Cold Worked Uranium

9:00 a.m.—Constitution Room

SURFACES AND QUANTITATIVE METALLOGRAPHY

Observations on the Thermal Etching of Silicon Iron

Theory of Lateral Facet Growth by Surface Diffusion

Relative Energies of Tilt-Type Sub-boundaries in Aluminum

Influence of Surface Intersections on Crystal Growth From the Melt

An Evaluation of Procedures in Quantitative Metallography for Volume-Fraction Analysis

9:00 a.m.—Cotillion Room

PRECIPITATION AND DISPERSION HARDENING

Hardness and Internal Friction Evidence for an Ordered Metastable Phase in Au-Ni Alloys

Behavior of the Electrical Resistivity of Cu-Fe Alloys on Plastic Deformation

Criteria for Yielding of Dispersion-Strengthened Alloys

Dispersed Particle Hardening of Aluminum - Copper Alloy Single Crystals

Mechanism of Hardening in Aged Aluminum-Copper Alloys

Strengthening by Precipitates in Al-Cu Alloys

9:00 a.m.—Embassy Room

TITANIUM

Effect of Hydrogen and Other Variables on the Thermal Stability of High Aluminum Containing Titanium Alloys

Stabilization of Certain Ti_2Ni-Type Phases by Oxygen

System Ti-TiO-ZrO-Zr

Effect of Rare Earth Metal Additions on the Transition Temperature and Lattice Parameter of Alpha Titanium

Development of a Mold Material for Titanium Castings

A study of Vacuum Arc Melting and Casting of Titanium

2:00 p.m.—Ballroom

SYMPOSIUM ON EFFECTS OF IRRADIATION ON FUEL AND FUEL ELEMENTS

Control Quenching to Improve Heat Treating

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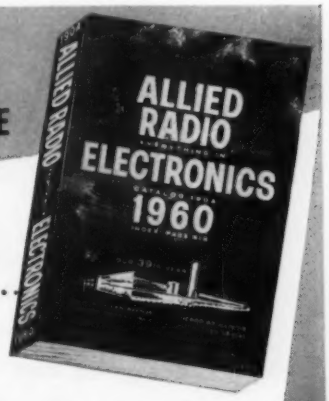

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PROGRAM

Irradiation Behavior of UO_2 Fuel Elements

The Swelling of UO_2 at High Burnup

Irradiation Testing of Plutonium-Uranium Oxide Nuclear Fuel

Effect of Radiation on Massive Uranium Carbide

Irradiation Behavior of ThO_2-UO_2 Fuels

Release of Fission Products from Fueled Graphite

2:00 p.m.—Constitution Room

PLASTICITY AND STRENGTH OF SINGLE PHASES

Effect of Quenching on Mechanical Properties of Molybdenum

Structure, Formation, and Properties of Chromium Filaments

Tensile Deformation of Aluminum Single Crystals at Low Temperatures

Observations on the Mechanisms of Deformation Leading to Fracture of Aluminum and Copper Specimens in Tensile Test

The Hedge Mechanism for Work-Hardening

Strain Aging in Ag-Al Alloys

Yield Point Phenomena in a Number of Commercial Copper Alloys and One Nickel Base Alloy

Solution Hardening by Interaction of Impurity Gradients and Dislocations

Deformation Characteristics of Mo-35 at pct Re

2:00 p.m.—Cotillion Room

REFRACTORY METALS

Fatigue and Tensile Properties of Columbium at Elevated Temperatures

Alloy Strengthening of Columbium

Strength Properties of Some Columbium-Base Alloys

Effect of Prestrain and Polygonization on the Creep Resistance of Molybdenum

Refractory Metal Thermocouples

Elevated Temperature Strength Properties of Tungsten

Physical and Mechanical State of Compacted Tungsten Powders as a Function of Pressing Rate, Particle Size Distribution, and Impurities

Mechanical Properties of Tungsten Wire

Mechanical Properties of Tungsten

Properties of Slip-Cast Tungsten

A Method for the Determination of Latent Heats of Impurities Which Undergo Phase Transformation When Tungsten Powder Compacts are Sintered

2:00 p.m.—Embassy Room

OXIDATION AND REDUCTION

Thermodynamic Properties of Titanium-Oxygen, Zirconium-Oxygen, and Hafnium-Oxygen Alloys

Oxidation of Iron in Carbon Dioxide—Carbon Monoxide Atmospheres

Mechanism of Oxidation of Iron in CO-CO_2 Mixtures

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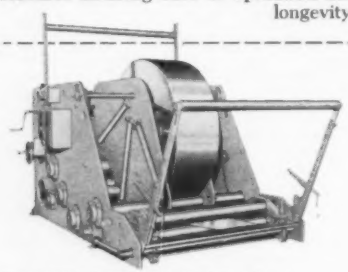

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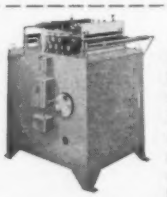

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PROGRAM

Oxidation of Ni-Rich Cu-Ni Alloys

Oxidation Characteristics of Cb Alloys Containing W, Mo, Ti, and Al

Dispersed Phase Alloys of Aluminum and of Silver

Equilibrium Study of Magnesium Reduction of Uranium Dioxide in Bismuth Matrix

Study of the Effect of Arsenic on the Reduction of Tungstic Oxide

Study of the Effect of Impurities on the Reduction of Tungstic Oxide

Thurs., Nov. 5

9:00 a.m.—Ballroom

SYMPOSIUM ON CURRENT PRACTICES IN THE MELTING AND CASTING OF NON-FERROUS METALS

Melting and Casting of Zinc at Trail, B. C.

Current Practices in the Melting and Casting of Copper Alloys

Melting and Casting Nickel Alloys

Gas and Its Control in the Casting of Aluminum

Factors Affecting the Structure of Continuously Cast Slabs of Aluminum

9:00 a.m.—Constitution Room

RECOVERY, GRAIN GROWTH AND TEXTURES, I

Recovery of the Extra-Resistivity of Cold-Worked Cadmium from 100°K to 273°K

Effect of Rolling Procedure on the Kinetics of Recrystallization of Cold-Rolled Iron

Preferred Orientation Resulting from Simple Shear

Kinetics of the Energy Release from Deformed Metals and Alloys

Polygonization of 31 pct Alpha-Brass

Subgrain Growth and Softening in Rolled Aluminum Crystals

Recrystallization of Cold Drawn Sintered Aluminum Powder

Effect of Impurities on the Re-

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crystallization of Tantalum

Migration of Grain Boundaries in Zone Refined Lead Containing Very Dilute Additions of Silver and of Gold

Swelling of Irradiated Alloy Fuels During Post Irradiation Annealing

9:00 a.m.—Cotillion Room

THEORY AND OBSERVATIONS OF IMPERFECTIONS

Dislocation Etch Pits and Plastic Deformation in Copper Single Crystals

Dislocation Networks in Zinc Crystals

Mobility of Edge Dislocations in Silicon-Iron Crystals

Study of Individual Dislocations in Alpha Brass

Observation of Dislocations in Aluminum by X-Ray Extinction Contrast

Dislocations and Sub-boundaries in Metal Crystals Grown from the Melt

X-Ray Measurement of Stacking Faults (SFs) in Deformed Cu-Si Wires

On Dislocation Formation by Vacancy Condensation

Contribution of Dislocation Line Tension and the Density of the Solute Atmosphere to the Yield Point in Strain Aged Ingot Iron

Effect of Orientation and Pre-Strain on the Delay Time of Aluminum Single Crystals

9:00 a.m.—Embassy Room

SYMPOSIUM ON POWDER METALLURGY

Molecular Processes at the Gas-Metal Interface

Effects of Oxide Films on the Sintering Behavior of Metal Powders

Equilibria Phenomena Between Gases and Solid Surfaces in Sintered Metals

2:00 p.m.—Ballroom

RESEARCH SUMMARIES CONCERNED WITH NON-FERROUS MELTING AND CASTING

FREE NEW Quick Reference CATALOG F-10R

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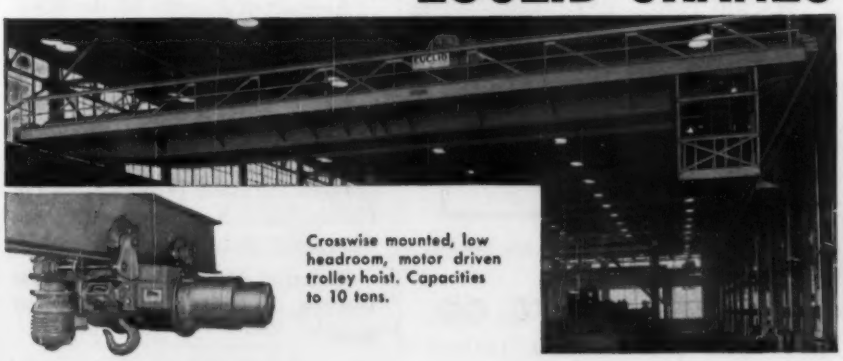
QUICK COUPLING ASSEMBLIES

Lots of illustrations clearly show the complete interchangeability of master gauged Kamloks. Detailed recommendations and sizing charts, typical specials for unique installations and factual information will help you in planning, selection and determining installation.

Just write us on your letterhead.

OPW-JORDAN
Jordan Corporation
Division of OPW Corporation
6013 Wiehe Road, Cincinnati 13, Ohio EL 1-1352

WAREHOUSE OPERATIONS
can be vastly improved with EUCLID CRANES



Crosswise mounted, low headroom, motor driven trolley hoist. Capacities to 10 tons.

Warehouse operational efficiency is contingent in no small way upon material handling efficiency.

Euclid overhead cranes are contributing more and more to the speed up in flow of materials in and out of today's warehouses.

Floor controlled and combination floor and cab controlled cranes are available in a range of types and capacities. The steel bar warehouse pictured here relies on their "Euclid" to handle a big share of the work.

Semi-gantry cranes handle mill shipments and the various materials for the processing lines.

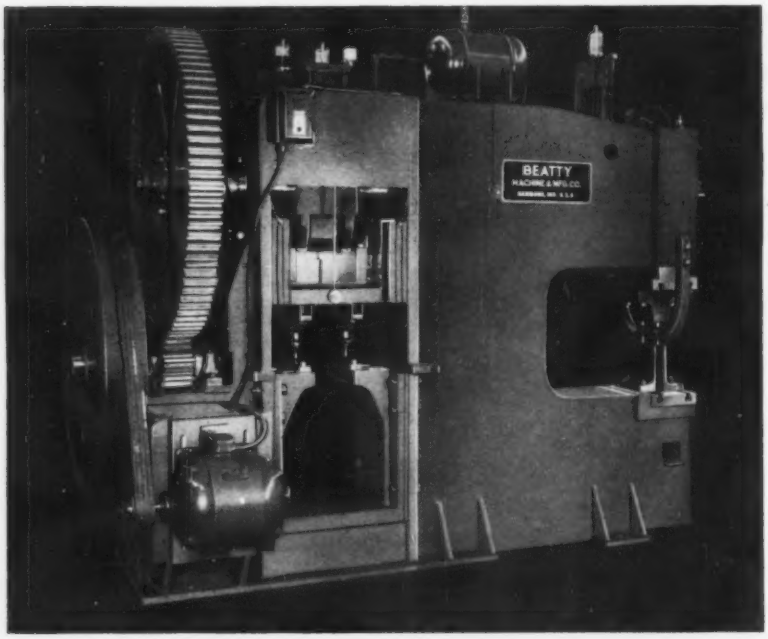
Chances are a survey by a qualified EUCLID representative may disclose an opportunity to improve your present facilities.

EUCLID

write TODAY for the CATALOG

The EUCLID CRANE & HOIST CO.
1365 Chardon Rd., Cleveland 17, Ohio

When Will ONE Machine Do The Work of THREE?



WHEN IT'S A BEATTY DETAIL BEAM PUNCH

Here's a real cost-saver that punches I-beams in just three passes instead of the usual five, and further speeds production by eliminating the end-for-end turning of beams. Many shops require three ordinary machines to do the work which can be handled by one Beatty Detail Beam Punch. This punch not only saves floor space, but also reduces your equipment investment. High dies in the open throat portion punch webs of beams, angles, channels and plates. Punch tools in overhanging bolsters in the guillotine portion punch holes in flanges on either side of the webs of beams. Write for complete details.

SPECIFICATIONS — No. 7 Detail Beam Punch. Capacity: 100-tons or punching 1¼" hole through 1" mild steel.
WEB PUNCH END: Face of Ram, 6" x 18" — Face of Table, 6" x 18" — Distance ram to table, stroke up, 21¾" — Length of Stroke, 1¾" — Depth of Throat, 30". FLANGE PUNCH END: Opening through frame, 26" — Length of stroke, 2" — Distance ram to table, stroke up, 12".

TOOL EQUIPMENT: WEB PUNCH END — One set single gag punch tools for punching plates, angles, webs of beams, channels and shapes. FLANGE PUNCH END — Two sets of single gag punch units suitable for punching flanges of beams and channel sections.
Punch units for both ends are of the drop stem type for locating the punch in proper position.

ONE OF THE BEATTY FAMILY OF METAL WORKING EQUIPMENT: Shears, Punches, Presses, Spacing Tables, Bulldozers, Stamping Trimmers

BEATTY MACHINE & MFG. CO.
936 150th St., Hammond, Indiana

PROGRAM

Vacuum Induction Melting of Mg-Li Alloys

Effect of Production Variables on the Quality of Light Alloy Castings

Study of Some of the Factors Influencing Grain Refinement in Non-Ferrous Alloys

A Cold-Mold Induction Furnace for Melting Reactive Metals Without Contamination

2:00 p.m.—Constitution Room

RECOVERY, GRAIN GROWTH AND TEXTURES, II

Evolution of Deformation and Recrystallization Textures in Cu-Ge and Cu-Sn Alloys

Effect of Grain Growth on the Formation of the Cube Texture in an Al-Mn Alloy

A Texture Problem Involving Orientation Density

Secondary Recrystallization in Cube-Textured 50 pct Ni-50 pct Fe Alloy Tapes

A Texture Study in Silicon Iron

Influence of Constraints During Rolling on the Textures of 3 Pct Si-Fe Crystals Initially (001) [100]

Observations on Cube Growth in Silicon Iron

Initial Growth of Cube-Oriented Secondary Recrystallization Nuclei in High-Purity Silicon Iron

Nature of the Matrix for Secondary Recrystallization to the Cube Texture in High-Purity Silicon Iron

2:00 p.m.—Cotillion Room

HEAT TREATMENT AND PROPERTIES OF STEELS

Anomalous Kinetics of the Bainitic Transformation Just Above the Ms Temperature

Effect of Pressure on the Martensitic Transformations in the Iron-Nickel System

Effect of Heat Treatment in the Ferrite-Austenite Region on Notch Toughness of Low-Carbon Steels

Preferred Orientation in Warm-Worked and Heat-Treated 4340 Steel

Effect of Sulfur on the Notch Toughness of Heat-Treated Steels

Magnetism in 0.30 C, 0.18 Cr, 8 Ni, and 3 Si Valve Steel Alloys

Effect of Tensile and Creep Prestrain on a Precipitation Hardening High Temperature Alloy

Measurement of Chi and Sigma Phases in Stainless Steel with the Electron Probe Microanalyzer

Recrystallization of Austenite

2:00 p.m.—Embassy Room

SYMPOSIUM ON POWDER METALLURGY

Infiltration of Alumina With Silver

Coulometric Reduction: A Tool for Studying Surface Films

Effects of Surface Parameters on Dimensional Changes in Iron-Copper Sinterings

METAL TREATING INSTITUTE

Thurs., Nov. 5—9:00 a.m.

Hotel Sherman—Assembly Room

SESSION ON HEAT TREATING

Heat Treatment of Gears

How To Obtain Specified Requirements Through Heat Treating

Carbon Control During Heat Treatment

ULTRASONIC MANUFACTURERS ASSOCIATION

Thurs., Nov. 5—2:00 p.m.

Hotel Sherman—Grand Ballroom

Ultrasonic Cleaning

Ultrasonic Processing

Ultrasonic Drilling, Machining, and Grinding

Ultrasonic Welding, Soldering, and Brazing

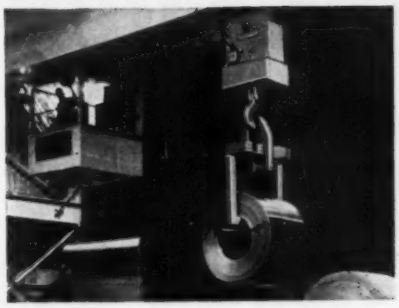
METAL POWDER INDUSTRIES FEDERATION

Wed., Nov. 4—2:00 p.m.

Hotel Sherman—Grand Ballroom

Clinic on Metal Powder Parts

MANSAVER® GRABS
Handle Millions of Tons in Your Industry



EXTRA CLOSE PILING!

The Mansaver Style 1418 motor-driven coil grab, because of its telescoping construction can stack coils evenly, close together, and higher, increasing floor space and providing more manufacturing area. In this installation it is suspended from a Mansaver 1588 motorized crane hook with collector rings for carrying current to the grab. Full 360 degree rotation is provided. When volume handled is small, savings can be made by using a similar grab arranged for hand operation.

CHECK ITEMS YOU HANDLE. SEND FOR LITERATURE AND MORE INFORMATION

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Also Manufactured in England

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COWLES

SHELL MOLDED PARTS

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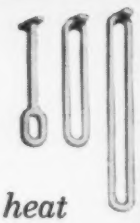

heat resistant

abrasion resistant

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- *accuracy*
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- *cut machining*
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CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

METAL SHOW EXHIBITORS

—A—

Aaron Machinery Co., Inc. ... 1246
Adolph Plating, Inc. ... 1298
Aerobraze Corp. ... 1509
Aero-Test Equipment Co., Inc. ... 1659
Aircraft & Missiles ... 1410
Ajax Electric Co. ... 1526
Ajax Engineering Div. ... 1506
Ajax Magnethermic Corp. ... 1506
Aktiebolaget Curto ... 1542
Allen Machine Tool Corp., Steve ... 1562
Allen Mfg. Co., W. D. ... 1855
Allied Research Products, Inc. ... 1212
Allison-Campbell Div. ... 1236
Alloy Engineering & Casting Co. ... 841
Alloy Products Corp. ... 1533
Alnor Instruments Div. ... 1741
American Brake Shoe Co. ... 727
American Cast Iron Pipe Co. ... 1230
American Chain & Cable Co., Inc. ... 953, 1236
American Cystoscope Makers, Inc. ... 201
American Gas Assn. ... 754
American Gas Furnace Co. ... 728
American Machine & Foundry Co. ... 1846
American Machine & Metals, Inc. ... 641
American Optical Co. ... 309
American Pullmax Co., Inc. ... 1705
American Sealants Co. ... 1751
American Society for Metals ... 810
American Steel Foundries ... 855
Amersil Quartz Div. ... 1430
Amplex Div. ... 1745
Anderson Bros. Mfg. Co. ... 1461
Anocut Engineering Co. ... 1416
Arcair Co. ... 1798
Arcweld Mfg. Co. ... 735
Armstrong Bros. Tool Co. ... 1624
Ashland Oil & Refining Co. ... 1460
Athenia Steel Div. ... 1336
Atlas Press Co. ... 1550
Atlas Steels Ltd. ... 828, 835
Atom Wheel Tool ... 1740
Austin Tool Co., Inc. ... 1264
Automatic Mill Div. ... 1742
Automotive Industries ... 1410

—B—

B. K. Roller Die Co. ... 828, 825
Babcock & Wilcox Co. ... 528
Baj Tool Co. ... 1511
Balteau Electric Corp. ... 120
Banner Welder, Inc. ... 1415
Barber-Colman Co. ... 1455
Barer Engineering & Machinery Co., Ltd. ... 502
Barry Controls, Inc. ... 1708
Basic Products Corp. ... 1605
Battelle Memorial Institute ... 819
Bausch & Lomb Optical Co. ... 219
Becker, Christian ... 960
Beryllium Corp. ... 1636
Binks Mfg. Co. ... 1541
Blakeslee & Co., G. S. ... 1641
Blue M Electric Co. ... 1442
Bowman Products Co. ... 1655
Bradley Washfountain Co. ... 1663
Branson Instruments, Inc. ... 1645
Branson Ultrasonic Corp. ... 1645
Brass Bronze Ingot Institute ... 1841
Brinkmann Instruments, Inc. ... 315
British Industries Corp. ... 1463
Brown Instrument Div. ... 1426
Brown & Sharpe Mfg. Co. ... 1357
Bruning Co., Inc., Charles ... 919
Brush Beryllium Co. ... 205
Budd Co. ... 1159
Buehler Ltd. ... 415

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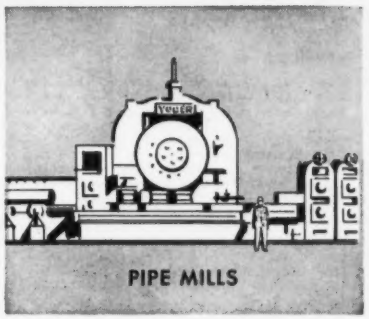
Cady, P. L. ... 1654
Canada Wire and Cable Co. Ltd. ... 828, 835
Canadian Government, Department of Trade & Commerce ... 828, 835
Charmilles Engineering Works, Ltd. ... 1768
Chem-Mill Div. ... 1724
Chicago Powdered Metal Products Co. ... 1597
Chicago Rivet & Machine Co. ... 1464
Chicago Tool & Engineering Co. ... 1365
Chilton Co. ... 1410
Chromalloy Corp. ... 1615
Chromizing Co. ... 1868
Chrysler Corp. ... 1745
Cincinnati Sub Zero Products ... 1756
Circo Equipment Co. ... 1537
Clausing Div. ... 1550
Cleveland Pneumatic Industries ... 1862
Cobalt Information Center ... 819
Collins Microflat Co. ... 910
Columbus Coated Fabrics Corp. ... 1662
Comet Industries ... 1760
Commander Mfg. Co. ... 1041
Como-Cast Corp. ... 1605
Consolidated Electrodynamics Corp., Rochester Div. ... 1468
Consolidated Mining & Smelting Co. of Canada Ltd. ... 828, 835



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Today's expanding markets and tightening economy demand closer production cost control. YODER'S complete line of ferrous or non-ferrous Pipe and Tube mills can help you meet production schedules economically... help you realize significant savings in the manufacture of tube and pipe.

YODER Pipe and Tube mills offer flexible production to meet fluctuating demand. They adapt easily to the most rigorous schedules. Everyday manufacture of constant high quality pipe and tube in diameter of 5/16" to 24". Speeds up to 350 fpm plus can be obtained with YODER mills.

YODER also makes a complete line of Slitting equipment and Cold Roll-Forming machinery. Send for your copy of the fully-descriptive book covering Tube Mill operation.

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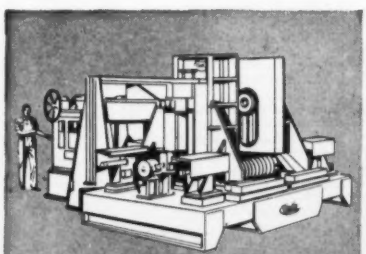
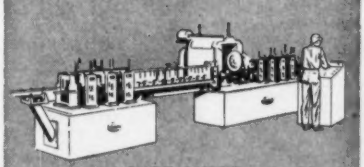
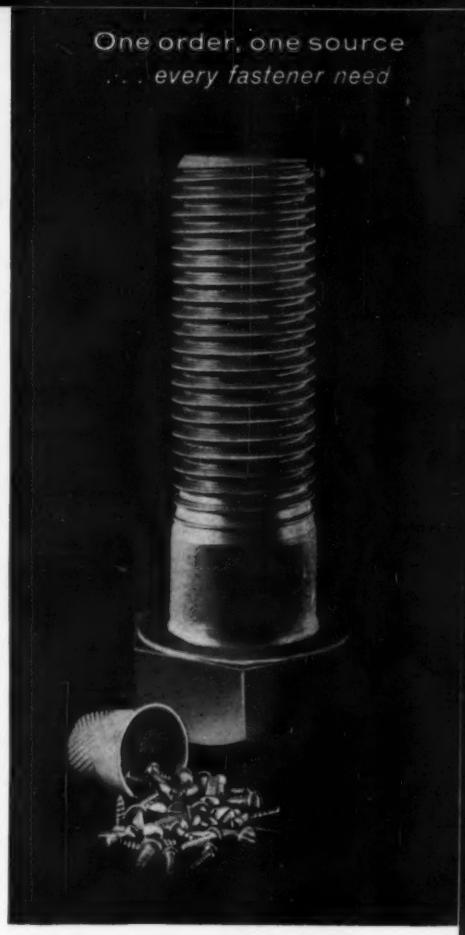

HEAVY DUTY UNCOILERS


TUBE MILLS

ENGINEERING YODER MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)

EXHIBITOR	BOOTH
Consolidated Vacuum Corp.	1468
Cooke, Troughton & Simms, Inc.	215
Criterion Machine Works	1264
Cross Perforated Metals Plant	1336
Curtiss-Wright Corp.	1730
Curto, AB,	1542
Cutting Tools, Inc.	1845
—D—	
Dake, Corp.	1650
Daystrom, Inc.	1649
Dayton Perforators, Inc.	1016
Delta Power Tool Div.	1042
de Sanno & Son, Inc., A. P.	1668
Detrex Chemical Industries, Inc.	1219
Detroit Hinge Mfg. Co.	1766
Detroit Testing Machine Co.	739
Deutsch Fastener Corp.	1738
DeVilbiss Co.	634
DeWalt Division	1846
Diamond Saw Works, Inc.	1344
Die-Draulic Grip, Inc.	1341
Die Supply Div.	602
Disston Div.	1456
Dixon Crucible Co., Joseph	1850
DoAll Co.	620
DoAll Midwest Co.	620
Dominion Electrohome Industries Ltd.	1052
Dominion Magnesium Ltd.	828, 835
Dow Chemical Co.	1047
Driver Co., Wilbur B.	1259
Drop Forging Assn.	1240
Dry Clima Lamp Corp.	1220
DuMaurier Co.	1737
DuPont deNemours & Co., E. I., Explosive Dept.	1655
DuPont deNemours & Co., E. I., Electrochemicals Dept.	1635
Durable Punch & Die Co.	1465
—E—	
Easco Products Division	1020
Eastman Kodak Co.	1429
Eldorado Mining & Refining Ltd.	828, 835
Electric Furnace Co.	1135
Electro-Alloys Div.	727
Electro Arc Sales Co.	1020
Electromark Corp.	1762
Elox Corp. of Michigan	1516
Elyria Foundry Div.	1615
Engelhard Chemical Div.	1430
Engelhard Industries, Inc.	1430
Ex-Cell-O Corp.	828, 835
Exomet, Inc.	1720
—F—	
Fannon Products Co., John J.	742
Far-Best Corp.	1549
Fenn Mfg. Co.	1329
Fenway Machine Co., Inc.	1054
Fischer & Co., H. G.	1317
Fisher Gauge Works Ltd.	828, 835
Fisher Scientific Co.	318
Fiske Brothers Refining Co.	948
Florida Development Commission	1065
Foxboro Co.	1340
Fuller Co. H. B.	1736
Furane Plastics, Inc.	1764
—G—	
Gaertner Scientific Corp.	320
Gas Appliance Service, Inc.	754
General Alloys Co.	548
General Blower Co.	848
General Electric Co.	860
General Fireproofing Co.	1060
Grand Valley Machine & Tool Co.	1341
Gray Co., Inc.	1612
Gries Industries, Inc.	1015
Gries Reproducer Corp.	1019
Grotnes Machine Works, Inc.	1856
Gulf Oil Corp.	1316
—H—	
Hacker & Co., Inc., William J.	420
Haller, Inc.	1053
Harper Electric Furnace Corp.	1027
Harris Refrigeration Co.	1226
Hayes, Inc., C. I.	531
Haynes Stellite Co., Div. of Union Carbide Corp.	527
Heath Engineering Co.	1335
Heli-Coil Corp.	1559
Heller Machinery Co.	1445
Heller's Son, Inc., E. G.	1445
Hevi-Duty Electric Co.	1605
High Vacuum Equipment Corp.	1356
Hitchiner Mfg. Co., Inc.	1735
Homestrand Machine Tool Corp.	1565
Hones, Inc., Charles A.	732
Houdaille Industries, Inc.	1667
Houghton & Co., E. F.	1406
Hupp Corp.	742
—I—	
Ilg Electric Ventilating Co.	848
Illinois Testing Laboratories, Inc.	1741
Impact Metal Products Co.	1754
Index Industrial Corp.	1515
Insta-Steam, Inc.	1269
Instron Engineering Corp.	1644
International Nickel Co. of Canada Ltd.	828, 835
International Tools Ltd.	828, 835
Ionic Electrostatic Corp.	1127
Ipsen Industries, Inc.	553
Iron Age, The	1410
—J—	
Janney Cylinder Co.	1561
Johansson Co., I. O.	1355
—K—	
Kawecki Chemical Co.	1328



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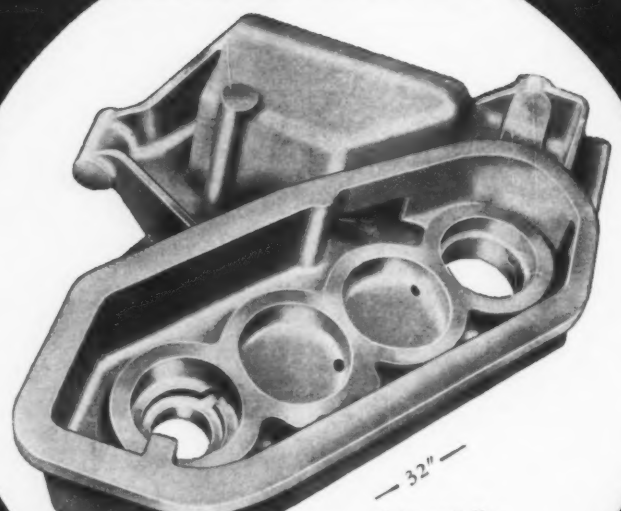

Wt. 190 lbs.

Courtesy Euclid Division General Motors, Cleveland

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EXHIBITORS

EXHIBITOR	BOOTH
Kemp Mfg. Co., C. M.	736
Kent Cliff Laboratories Div.	960
Kester Solder Co.	842
King Tester Corp.	419
Kinney Mfg. Div.	1819
Koike Sparkle Machine Co.	1445
Kolene Corp.	836
Krouse Testing Machine Co.	1159
Kux Machine Co.	1570
—L—	
Laboratory Equipment Corp.	1755
La Deau Mfg. Co.	1606
Lake Chemical Co.	1423
Lake Erie Machinery Corp.	1654
Latrobe Steel Co.	1350
Lee Co., K. O.	1023
Leeds & Northrup Co.	836
Leitz, Inc., E.	426
Lempco Industrial, Inc.	602
Lennox Industries, Inc.	916
Lennox Tool & Machine Builders, Div.	916
Lepel High Frequency Laboratories, Inc.	1807
Lilly and Co., Eli	1311
Lindberg Engineering Co.	520
Lindberg Industrial Div.	520
Los Angeles Dept. of Water & Power	1268
Loy & Associates, Frank	1264
Lufkin Rule Co.	401
—M—	
M.B.I. Export & Import Ltd.	1346
M. H. Machines	1542
Machine & Tool Div.	602
Machine Tool Manufacturers Affiliates, Inc.	1276
Magnaflux Corp.	865
Magnetic Analysis Corp.	319
Mahr Gage Co., Inc.	316
Makepeace Div., D. E.	1430
Malayan Tin Bureau	954
Mannesmann-Meer, Inc.	1867
Man-Au-Cycle Corp. of America	1306
Markal Co.	1423
Martin Engineering Co.	1739
Martindale Electric Co.	1753
Masten Bearing Sales, Inc.	1745
Matson Co.	1059
McKay Machine Co.	1843
McWilliams Forge Co.	1754
Mead Specialties Co.	1324
Mercuria Co.	1397
Metal Improvement Equipment Co.	1868
Metal Lubricants Co.	948
Metal Powder Industries Federation	533
Metal Removal Co.	1835
Metallographic Exhibit (ASM)	560
Metals Engineering Institute	810
Metals Processing Div., Curtiss-Wright Corp.	1730
Mettler Machine Tool, Inc.	1712
Micrometrical Mfg. Co.	1265
Milwaukee Electric Tool Corp.	1757
Mine Safety Appliances Co.	1361
Minneapolis-Honeywell Regulator Co.	1426
Minnesota Mining & Manufacturing Co.	1048
Mitchell Radition Products Corp.	220
Mitsubishi Electric Mfg. Co.	1445
Montgomery Tool Co.	1744
Moore & Co., Samuel	1231
Morando Co.	1562
Morgardschammar	1542
—N—	
NRC Equipment Corp.	1227
Narda Ultrasonics Corp.	1628
National Bureau of Standards	1823
National Carbon Co., Div. of Union Carbide Corp.	527
National Electric Instrument Div.	1430
National Refining Co.	1460
National Spectographic Laboratories	311
National-Standard Co.	1336
National Ultrasonic Corp.	924
New Hermes Engraving Machine Corp.	840
New York Air Brake Co.	1819
Noranda Mines Ltd.	828, 835
Nordson Corp.	1028
North American-Viking Drill Co.	1498
Nuclear Materials & Equipment Corp.	1746
Nuclear Metallurgical Enterprises, Inc.	922
Nuclear Systems Div.	1159
—O—	
Oakite Products, Inc.	1036
Ohio Crankshaft Co.	1530
Okuma Machinery Works, Ltd.	1445
Olivetti Corp. of America	1022
Olsen Scientific Instruments, Inc.	216
Olsen Testing Machine Co., Tinius	1616
O'Neil-Irwin Mfg. Co.	1035
Opto-Metric Tools, Inc.	301
Orenda Engines Ltd.	828, 835
—P—	
Pangborn Corp.	1239
Park Chemical Co.	723
Pathex (Canada) Ltd.	828, 835
Pathex Ltd.	1450
Payne Tool and Engineering Co.	1716
Perfection Industries Div.	742
Perfecto-Peen Div.	1659
Perkin-Elmer Corp.	312
Permattach Diamond Tool Corp.	1735
Peterson Machine Tool, Inc.	1767
Phillips Mfg. Co.	825
PIC Design Corp.	1759
Picker X-Ray Corp.	126

EXHIBITOR	BOOTH
Pivot Punch & Die Corp.	959
Portage Double Quick, Inc.	1845
Porter Co., Inc., H. K.	1456
Porter Precision Products	1465
Precision Extrusions, Inc.	943
Pressco Casting & Mfg. Corp.	844
Princeton Div., Curtiss-Wright Corp.	1730
Progressive Chemical & Equipment Co.	1271
Propellex Chemical Div.	1615
Protection Controls, Inc.	1718
Pyrometer Instrument Co., Inc.	1725
—R—	
Ransburg Electro-Coating Corp.	1250
Raymond Corp.	1339
Raytheon Co.	1811
Reichert Optical Works	420
Relton Corp.	1723
Renco-Aire Div.	1862
Rexo-Therm, Inc.	1207
Reynolds Wire Div.	1336
Richards Co., J. A.	1211
Riehle Testing Machines Div.	641
Rochester Div.	1468
Rockwell Mfg. Co.	1042, 1750
Ryerson & Son, Inc., Joseph T.	627
—S—	
S & S Machinery Co.	1306
Sanford Process Co., Inc.	1549
Scherr-Tumico Co.	1629
Schmidt, Inc., Geo. T.	1330
Schrader's Son, A.	1625
Scientific Electric, Inc.	1127
Scovill Mfg. Co., Inc.	1625
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Selas Corp. of America	720
Sentry Co.	1719
Shaw Process Development Corp.	1463
Sheldon Machine Co., Inc.	1749
Shell Oil Co.	1642
Shuster Div.	1712
Sieburg Industries, Inc.	1742
Sinclair Refining Co.	1525
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Smith Corp., A. O.	1446
Socony Mobil Oil Co., Inc.	1366
South Chester Corp.	1640
Southco Div.	1640
Special Libraries Assn.	1469
Spee-Flo Sales Corp.	1815
Spencer Turbine Co.	746
Sperry Gyroscope Co. of Canada, Ltd.	828, 835
Sperry Products, Inc.	212
Spitfire Tool Co.	1529
Star Expansion Industries Corp.	1440
Starrett Co., L. S.	1256
Steco Corp.	1748
Steel City Testing Machines, Inc.	1727
Stimpson Co., Inc., Edwin B.	628
Stokes Corp., F. J.	542
Storch Products Co.	928
Struers Scientific	420
Supreme Products Corp.	1863
Surface Combustion Corp.	648
Swift & Co.	920
—T—	
Tatnall Measuring Systems Co.	1159
Techline Div.	1733
Tempil Corp.	225
Tensilkut Div.	1742
Texaco Inc.	965
Tin Research Institute, Inc.	815
Tocco Div.	1530
Torsion Balance Co.	960
Tree Tool & Die Works	1829
Tubular Micrometer Co.	1629
Tubular Rivet & Stud Co.	1761
Turco Products, Inc.	1724
—U—	
Union Carbide Corp.	527
Union Carbide Metals Co., Div. of Union Carbide Corp.	527
United Scientific Co.	820
U. S. Department of Commerce	1823
United States Gypsum Co.	1660
Unitron Instrument Div.	820
Universal Castings Corp.	1656
Upton Bradeen & James, Inc.	1436
—V—	
Vacuum Equipment Div.	1819
Valvoline Oil Co.	1460
Vanadium Alloys Steel Co.	536
Vanadium Corp. of America	640
Vapor Blast Mfg. Co.	1512
—W—	
Wah Chang Corp.	1560
Wales-Strippit, Inc.	1667
Walker Peenimpac Machine Mfg. Div.	947
Walker Pump Co.	947
Walker-Turner Div.	1750
Wallace Supplies Mfg. Co.	941
Waukee Engineering Co.	1235
Wells Manufacturing Corp.	1729
Wells & Sons, W. F.	1344
Western Gold & Platinum Co.	1259
West Instrument Corp.	1715
Western Tube Co.	828, 835
Westinghouse Electric Corp.	1630
Weston Instruments Div.	1649
Wheelabrator Corp.	1536, 1733
Wheelco Instruments Div.	1455
Williams Machines Ltd.	828, 835
Wilson, Inc., K. R.	1566
Wilson Mechanical Instrument Div.	953
Winslow Product Engineering Corp.	1362
Worcester Wire Works Div.	1336

For top efficiency in tank cleaning

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OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

First choice in heavy-duty tank cleaning—hard-working Oakite "24"

Users everywhere agree that their best way to clean iron and steel parts is to tank-soak them in a hot solution of heavy-duty Oakite 24. This hard-working alkaline cleaner gets under the dirt layers and literally tears the soil from the surface. Despite excessive soil contamination of solution Oakite 24 maintains proper pH level and provides long, effective cleaning action.

Oakite 24 is but one of a wide range of alkaline tank-cleaning compounds. Others include medium and light duty oil and grease removers; self-emulsifying solvent cleaners specially designed for removing buffing compound residues, pigmented drawing compounds and other tenacious burned-on solid-particle dirts and smuts. Also available is a useful selection of materials for cleaning brass, copper, aluminum, magnesium, lead, tin and zinc.

Which is best for you? Only you and the Oakite man together can decide. It depends on your equipment, the parts you process, the next production step. Ask the Oakite man. From over 30 materials, you're *sure* to get the one cleaner that works most efficiently for you. Write for Bulletins. Oakite Products, Inc., 34G Rector Street, New York 6, N. Y.

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years' leadership in industrial cleaning

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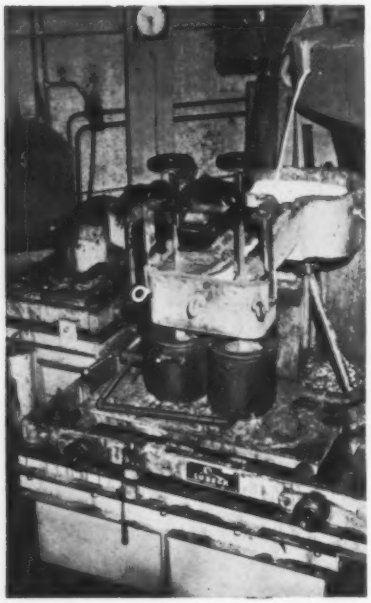

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- **EXTRUSION BILLETS**
- **ROLLING MILL SLABS**
- **WIRE BARS**

Now the revolutionary LOBECK direct-chill casting technique allows all copper and copper-base alloys to be cast continuously with maximum efficiency. Materials ranging from phosphor deoxidized copper to silicon and aluminum bronzes are being produced in lengths up to 25 ft. The new casting process greatly reduces capital investment and metal production costs. Metallurgically, the d.c. cast product has a superior surface finish and a greatly improved internal structure entirely free of porosity. LOBECK furnishes your complete casting shop and trains your personnel.

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CASTING PROCESSES INC.

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 283.

Die Alloy

An improved die alloy for drawing, forming, or bending stainless and mild steel is described in a product bulletin. It offers good impact resistance, long life between dressings, and improved machining qualities, and practically eliminates galling and scratching. (Ampco Metal, Inc.)

For free copy circle No. 1 on postcard, p. 283

Industrial Saws

Catalog inserts describe additions to a line of industrial saws, including metalcutting saws and machine knives. (Disston Div., H. K. Porter Co., Inc.)

For free copy circle No. 2 on postcard, p. 283

Horn Presses

A 12-page bulletin illustrates and describes a line of horn presses in capacities from 50 to 200 tons. (The Federal Machine and Welder Co.)

For free copy circle No. 3 on postcard, p. 283

Pedestal Crane

An illustrated folder gives data on a pedestal-mounted electric crane of 6-ton capacity, well adapted for installation wherever space is at a premium. From a 5-sq ft space, it will serve 2150 sq ft. (R. G. LeTourneau, Inc.)

For free copy circle No. 4 on postcard, p. 283

Bonding Aluminum

A 20-page booklet covers adhesive bonding of aluminum, very advantageous in certain applications. Discussed are joint design, types of adhesives, and processing of adhesive joints. (Reynolds Metals Co.)

For free copy circle No. 5 on postcard, p. 283

Heat Exchangers

A bulletin describes five standard types of thermal fired heat exchangers. They have temperature ratings up to 1900°F, flow rates of air up to 550 lb per second, and pressure ratings up to 5000 psig. (Thermal Research & Engineering Corp.)

For free copy circle No. 6 on postcard, p. 283

Thermocouples

A 52-page catalog details a full line of thermocouples, components, and accessories. Standard and special-purpose assemblies are included. (Leeds & Northrup Co.)

For free copy circle No. 7 on postcard, p. 283

Radiation Thermometer

A two-page product bulletin describes a model of radiation thermometer whose six modifications span a range from 180° to 2000°F. It measures the temperature of a remote object without physical contact, but by the thermal radiation that it emits. This instrument is

therefore useful for measuring the temperature of moving and inaccessible surfaces. (Radiation Electronics Co.)

For free copy circle No. 8 on postcard, p. 283

Special Tubing

A special analysis memo describes small seamless columbium, tantalum, and vanadium tubing, and discusses present and potential applications. (Superior Tube Co.)

For free copy circle No. 9 on postcard, p. 283

Hydraulic Press Brakes

A four-page bulletin describes a line of 44 models of hydraulic press brakes with capacities from 200 to 1000 tons. Differences from mechanical brakes are specified. (Niagara Machine & Tool Works)

For free copy circle No. 10 on postcard, p. 283

Chemical Products

A 44-page catalog compiles properties and uses of 375 industrial and other chemicals. An expanded section on plastics and coating products is included. (The Dow Chemical Co.)

For free copy circle No. 11 on postcard, p. 283

Polishing Machines

An eight-page brochure details construction and operation features of a complete line of machines for grinding and polishing coils, blanks, and sheets of all materials. Descriptions of auxiliary equipment and variations and combinations of equipment are included. (Murray-Way Corp.)

For free copy circle No. 12 on postcard, p. 283

300-lb Gate Valve

A brochure describes two lines of newly designed bronze gate valves for tough service and easy maintenance, featuring a 300-lb model. (Crane Co.)

For free copy circle No. 13 on postcard, p. 283

Safer Starting

A new bulletin presents latest findings on the mechanism of explosions and shock waves in pipelines

THE CLEANING MACHINE THAT GROWS WITH YOU!

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AIR OPERATED.
MOTORLESS AND GEARLESS AUTOMATIC AGITATING AND LIFTING DEVICE. ONLY 4 MOVING PARTS.
SINGLE LEVER CONTROL FOR LOWERING, AGITATING AND RAISING THE WORK.
VARIABLE SPEED AGITATION FROM 0 — 160 MOTIONS PER MINUTE. ACTUALLY SHEERS THE DIRT OFF.
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FLEXIBLY ENGINEERED to offer you the time, labor and material savings of mechanically agitated cleaning **today** and **tomorrow**, the Magnus Aja-Lif adapts to current needs — never becomes obsolete.

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YOU OWE IT TO YOUR FUTURE to find out about the benefits which the Aja-Lif offers TODAY!

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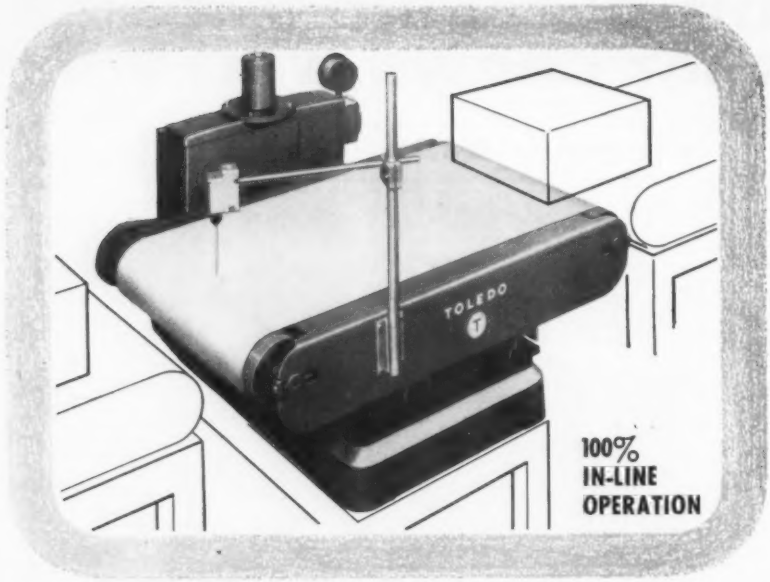

FAST, AUTOMATIC, IN-MOTION
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WITH NEW TOLEDOS

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Items 50 to 200 Lbs.,
to 40 per min.

MODEL 9463
Items 5 to 50 Lbs.,
to 40 per min.

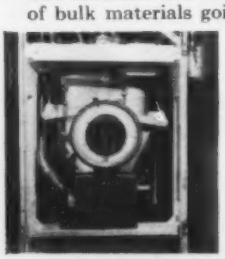
Get 100% in-line checkweighing with these new Toledos! Checkweigh bags, cartons, packages, parts and pieces automatically. You'll save time, labor and material . . . keep weights consistent . . . build customer goodwill.

Designed with continuous-running motorized conveyor on the weigh section, these Checkweighers fit readily into conveyor lines . . . are accurate to one part in 3,000. Available with remote zone indication stations for continuous visual check, magnetic counters to accumulate operating data, and other advanced Toledo features.

Now is the time to check into Toledo Checkweighers for your operations! Send for Bulletin 2968. TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio.

Toledo Automatic Bulk Weighing . . . net weight listing and totaling

Get accurate net weight listing and totaling of bulk materials going into truck or carload shipments. Weighing is automatic. You save time, control costs and reduce claims. The Toledo control console which interlocks all elements of the system, may be remotely located for operating convenience. Ask for Bulletin 2490.



SERVICE Factory-Trained 200 Cities

TOLEDO®
Headquarters for Weighing Systems

FREE LITERATURE

and compressor starting air lines. These observations are then applied to compressor air starting systems, providing a more thorough understanding of the origin of explosions and the propagation of shock waves within the piping. A discussion of preventive measures is included. (Clark Bros. Co.)

For free copy circle No. 14 on postcard, p. 283

Process Computer

A process-control computer system which is given an order and handles a production process accordingly is described in a six-page folder. It can also be used to solve complex engineering calculations, or to automate material handling. (Radio Corp. of America)

For free copy circle No. 15 on postcard, p. 283

Hydraulic Shears

A 16-page catalog provides construction details and specifications on a line of hydraulic shears with pivoted-blade action. They come in sizes for cutting metal in lengths to 30 ft and in thicknesses to 2 in. Features for easy and trouble-free operation are stressed. (Steelweld Machinery Div., The Cleveland Crane & Engineering Co.)

For free copy circle No. 16 on postcard, p. 283

Production Ideas

A small booklet presents a number of production innovations helpful to the author company, and passed on for others to use. Included are a brush burrer, a special tilting drill-press table, tool racks, using a punch press for shearing, and other ideas. (Wolverine Tube)

For free copy circle No. 17 on postcard, p. 283

Vibrating Finisher

A bulletin describes a 3-hp vibrating finishing machine for precision finishing of metal, plastic, or wooden parts. With a 1.1-cu ft capacity, it works far faster than tumbling barrels. (Lord Chemical Corp.)

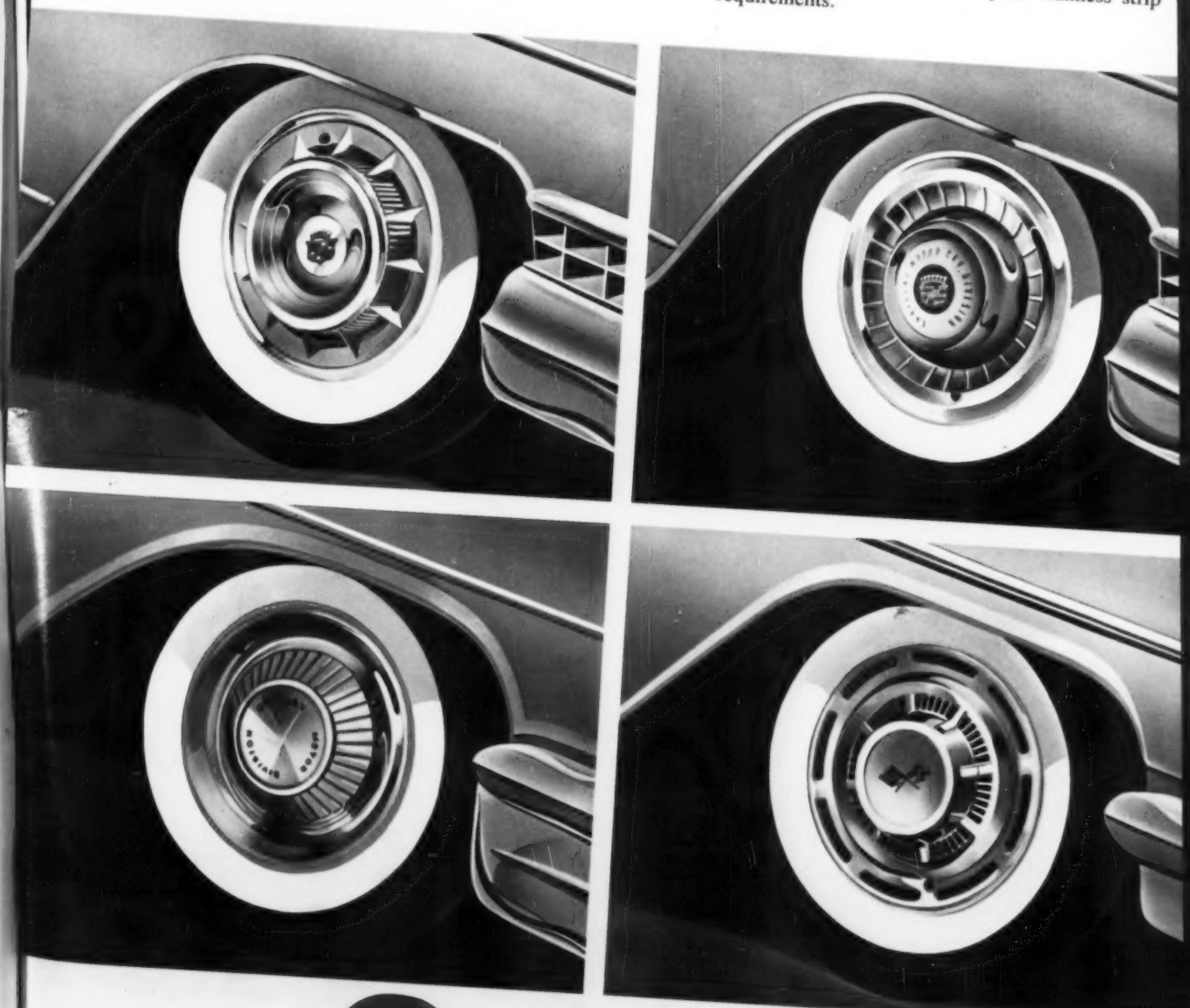
For free copy circle No. 18 on postcard, p. 283

On cars of TOP PRESTIGE and HIGHEST VOLUME

you'll find **wheel covers** of

Superior
STAINLESS STEEL

Leadership demands the best in performance . . . and only stainless steel will do for the gleaming wheel covers of leading cars. We are most proud that SUPERIOR Stainless Strip Steel is used in the fabrication of wheel covers by Brown-Lipe-Chapin. Every stainless quality is in our product, plus the finer forming behavior that is traditionally Superior. Let us discuss your stainless strip requirements.



The wheel covers illustrated were fabricated by Brown-Lipe-Chapin Division, General Motors Corporation, Syracuse, New York.

SUPERIOR STEEL DIVISION
OF
COPPERWELD STEEL COMPANY
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For Export: Copperweld Steel International Company, New York

To a generation of our fighting forces, this slogan meant a way to stay alive. Doesn't it have a less dramatic parallel in industry today?

We *have* to know or lose out to competitors who do. Are we building acceptable quality? . . . Are rejects needlessly high? . . . Are we losing profitable production as a result or falling behind on delivery schedules? . . . How many customers may we lose this way? . . . And who gets blamed?

If any of these are your personal or company worries, we believe we can help you find an answer through the right nondestructive testing system. "Right" because there's a Magnaflux System pinpointed to your needs . . . whether to meet tightest specifications, job lot testing, or highest speed production testing.

From Magnaflux you'll find a recognized reliable supplier, with the greatest number of specialized test systems, and the widest selection of equipment and models in each to meet your specific needs. Standard or tailor-made, there's test equipment to do your work precisely and economically.

Your wisdom in selecting a Magnaflux System is supported by leading engineers, production managers and testing laboratories; — more Magnaflux Systems are used for more test operations than all others combined. The tests apply to *any* solid material, metal or non-metal—even for hardness, conductivity, or alloy composition.

Incidentally — and to any extent you may want it — our service includes a recognized standard of complete and impartial on-the-spot counsel, training courses, research developments to meet individual problems and prompt contact with some of the world's finest testing engineers. We say this right out, because nondestructive testing now has been our full time occupation for 30 years.

Why not talk to a Magnaflux Engineer *now*. Even if you don't have pressing problems at the moment, it's a good way to be sure you'll *stay* out of trouble.

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New York 36 • Pittsburgh 36 • Cleveland 15
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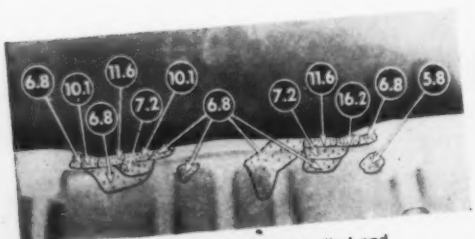
The Hallmark of Quality in nondestructive test systems

As your "House of Answers" Magnaflux offers you:

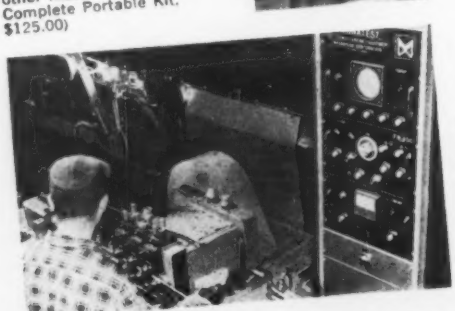
MAGNAFLUX-MAGNAGLO to test magnetic materials for cracks, etc.

ZYGLO for nonmagnetic and other materials (Shown: Complete Portable Kit. $125.00)

SONIZON Ultrasonic Testing



STRESSCOAT to find and measure stress on parts.



MAGNATEST electronic testing for hardness, conductivity, alloy, proximity, and many more.

And still other methods and techniques, some completely new.

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Forklift Trucks

A 16-page brochure details a series of engine-powered forklift trucks for heavy-duty industrial service. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 21 on postcard

Actuator Switches

A two-page data sheet covers two new designs added to a line of small, enclosed snap-action switches —a one-way roller arm and a rod actuator. The roller-arm switch provides actuation in one direction only, and is for machine tools employing a slide to actuate the switch and override it, but not actuate it on the return stroke. The rod-actuated switch is for use with counters, conveyors, and sorting devices. (Micro Switch)

For free copy circle No. 22 on postcard

Flowmeter

An eight-page bulletin describes theory, operation, and advantages of an industrial flowmeter that measures flow of fuels, industrial liquids, and gases directly in pounds. (General Electric Co.)

For free copy circle No. 23 on postcard

Aircraft Fasteners

A reference chart illustrates a complete line of precision aircraft bolts, nuts, and special fasteners. Included are tension, shear, and engine bolts; locknuts; plate nuts; titanium bolts; and various other standard fasteners. Materials include both aircraft-quality alloy and corrosion-resistant stainless steels, as well as many new superalloys. Fasteners with maximum tensile strengths to 260,000 psi are included, with service temperatures to 1600°F. (Standard Pressed Steel Co.)

For free copy circle No. 24 on postcard

Welding Equipment

A 40-page manual features a full line of gas welding, cutting, and allied equipment. It also carries charts and technical data on the various items, and flow-capacity curves for a line of gas-pressure regulators. (Smith Welding Equipment Corp.)

For free copy circle No. 25 on postcard

Tank Lining

A six-page illustrated brochure describes a dense, flexible polyvinyl-chloride sheet for lining plating, pickling, and other tanks and vessels. It protects steel and concrete tanks from attack by solutions, and prevents contamination of the solutions. It comes in two forms, for original use or later insertion, respectively. (Amercoat Corp.)

For free copy circle No. 26 on postcard

Die Spray Guns

A catalog sheet covers spray guns for die lubrication. Included are specially designed automatic guns for applying lubricating oils or drawing compounds to dies or all types of coolants to abrasive wheels and to belts. The spray pattern is adjustable from a fine, round shape to a broad fan. (The DeVilbiss Co.)

For free copy circle No. 27 on postcard

Aluminum Preparation

A process for preparing commercial aluminum alloys for any type of electrodeposit is fully described in a five-page data sheet. (MacDermid Inc.)

For free copy circle No. 28 on postcard

Flexible Couplings

An expanded line of flexible cushion couplings ranging from fractional to 190 hp per 100 rpm is described in a 12-page bulletin.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **10/22/59**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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FREE LITERATURE

They have a flexing body that automatically compensates for all combinations of misalignment and end float, and absorbs torsional vibration. Selection data are included. (Dodge Mfg. Corp.)

For free copy circle No. 29 on postcard

Spline Drive Armatures

A four-page bulletin describes a spline drive armature for heavy-duty applications on primary brakes and clutch-couplings. Large bearing surface and automatic wear-compensation are features. (Warner Electric Brake & Clutch Co.)

For free copy circle No. 30 on postcard

Ingot Molds

A four-page bulletin presents three varieties of ingot molds for vacuum-induction and controlled-atmosphere melting. (Zak Machine Works, Inc.)

For free copy circle No. 31 on postcard

Band Saw

A five-page circular describes a horizontal band saw for cutting off, and outlines the advantages that band-sawing with HSS band blades offers over other cutoff methods. A cost-analysis service is offered. (The Henry G. Thompson & Son Co.)

For free copy circle No. 32 on postcard

Casters and Wheels

A complete line of casters and wheels is fully outlined in a 40-page catalog. A two-page index is included to simplify the checking of caster or wheel specifications for any particular application. (Rapids-Standard Co., Inc.)

For free copy circle No. 33 on postcard

Mechanical Packings

A 64-page catalog contains comprehensive information on a complete line of mechanical packings. Cross-section photos illustrate their applications in detail, and are designed to help selection. (Johns-Manville)

For free copy circle No. 34 on postcard

Maintenance Equipment

A 24-page catalog describes a line of all types of industrial maintenance equipment, including push-pullers, pumps, shop presses, and heavy-duty wrenches. (Owatonna Tool Co.)

For free copy circle No. 35 on postcard

Run-In Lubrication

A brochure discusses the lubrication problems involved in assembly and run-in operations and methods of overcoming them. The manufacturer's line of colloidal lubricants is recommended as superior in such operations. (Acheson Colloids Co.)

For free copy circle No. 36 on postcard

Vibration Mounts

A two-page bulletin briefly discusses a line of mounts for isolating shock and vibration in machine tools and other equipment. (Barry Controls Inc.)

For free copy circle No. 37 on postcard

Barrel Finishing

An attractive 36-page booklet describes in detail a technique for scientifically controlled precision barrel finishing. A complete line of tumbling media, barrel-finishing compounds, and precision barrel-finishing machines and equipment is listed for the full range of tumbling operations. It constitutes a compact encyclopedia on barrel finishing. (The Carborundum Co.)

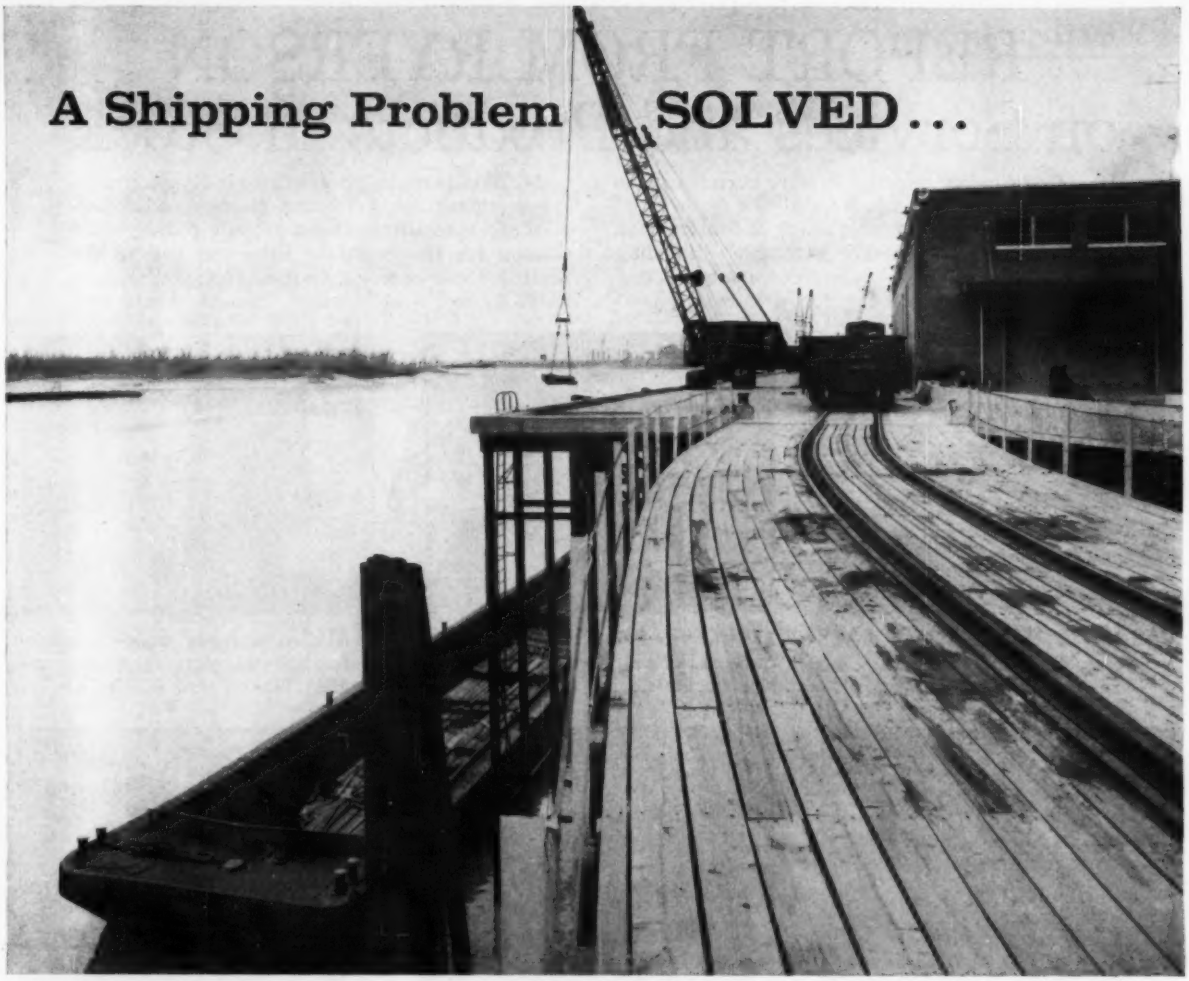
For free copy circle No. 38 on postcard

Iron-Clad Flooring

A 24-page bulletin explains the long life of an "iron-clad" flooring having an armored surface ⅛-in. thick. It is produced by dusting a dry mixture of iron aggregate and cement on the surface of freshly floated concrete. This armor surface "gives" under traffic, producing great wear-resistance. (The Master Builders Co.)

For free copy circle No. 39 on postcard

A Shipping Problem SOLVED...



...at MEMPHIS, Crossroads of materials and markets

If the South, Southeast, Southwest or Mid-West is all or part of your market for metals, metal products or machinery, then you should seriously consider Memphis, Tennessee, in your expansion or re-location plans. Here's why:

MEMPHIS is an inland port and transportation center.

MEMPHIS is the geographic center of a 17-state market.

MEMPHIS offers second morning or better delivery to these 17 states by rail or truck.

MEMPHIS Port is served by five barge lines operating scheduled service to all navigable points on the Mississippi, Missouri, Illinois, Tennessee, Ohio and secondary rivers; and to shipside at the Gulf of Mexico.

MEMPHIS Port facilities are served by 91 motor freight lines reaching all 48 states, Canada and Mexico.

MEMPHIS Port rail facilities connect directly with eight trunk line railroads having 17 radiating lines to provide direct one-line service to 25 states.

MEMPHIS has more than 11,500 acres available in planned industrial districts.

MEMPHIS utility rates are among the lowest in the nation.

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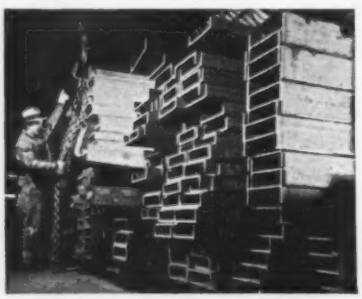

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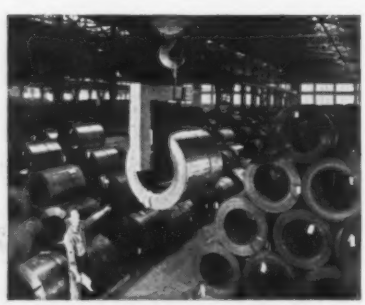

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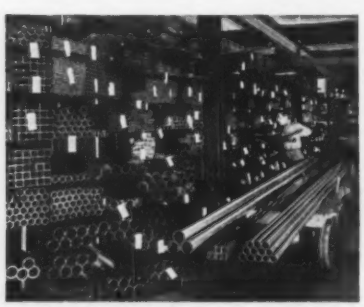

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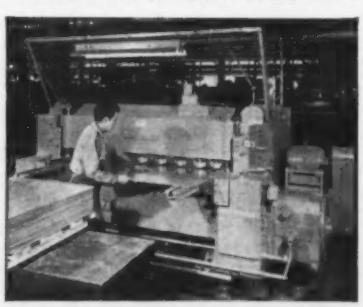

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The Iron Age Summary

Frustrations Ahead for Consumers

It will be weeks after mills are reopened before first balanced shipments of steel start to flow.

Mills will allocate ingots to product and sales offices will allot products to consumers. Competition for all steel will be tough.

▪ It will take at least a month after the first back-to-work call before steel users will get real relief.

This is a probable timetable for the flow of steel after workers go back on the job:

Shipping Timetable—It will take from 10 days to two weeks before ingot production reaches 85 pct of capacity. But ingot production alone is only of academic interest to consumers.

It will take from two to three weeks before any new finished steel will be shipped in substantial tonnages. Only small amounts of finished or of steel in mill pipelines will move immediately.

It will take from four to six weeks before users can expect balanced shipments. This is significant because what little steel remains in inventories is far out of balance. It is virtually useless until inventories are filled out.

This means that additional layoffs in manufacturing plants are inevitable for a period of at least a month after the first steel is poured.

User Problems—Steel users face the complication of two screening factors in the availability of steel.

First, mills will be very selective in alloting ingots to specific products. It is expected that mills will feed all the ingots they can to sheet mills. However, this situation varies with the mill, and depends on finishing capacity and established customer relationships.

Second, steel will be on strict allotment from the sales offices. Customers will exert every pressure possible to obtain steel.

Production Problems—Automakers, desperate for steel to keep up the momentum of sales of new 1960 models, will press for every bit of steel they can get. Appliance makers and farm equipment makers will be there in competition.

In getting back into production, mills face problems that are without precedent.

Damage to blast furnaces and openhearths, and excessive maintenance required on finishing equipment, will be greater than ever before sustained in a steel strike.

Workers Reluctant—And under the Taft-Hartley injunction, it will be the first time that steelworkers have unwillingly gone back to work under government pressure. (When President Truman seized the industry in 1952, the move was generally favored by the steelworkers.)

If production lags behind expectation, as seems likely, some products will suffer as mills channel more ingots to sheet production. Most likely to be shorted are bars, wire, structurals and pipe.

This means that mill order books, as they stand now, actually will have little import.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	368	368	353	2,024
Ingot Index				
(1947-1949=100)	22.9	22.9	22.0	126.0
Operating Rates				
Chicago	5.0	5.5*	5.0	85.0
Pittsburgh	4.0	4.0	4.0	69.0
Philadelphia	12.0	12.0	12.0	77.0
Valley	10.0	10.0	10.0	61.5
West	0.0	0.0	0.0	77.0
Cleveland	0.0	0.0	0.0	82.0
Detroit	25.0	25.0	25.0	80.0
Buffalo	0.0	0.0	0.0	78.0
South Ohio River	73.0	73.0	65.0	80.0
South	12.0	12.0	12.0	63.5
Upper Ohio River	55.5	55.5	53.0	88.0
St. Louis	102.5	96.0*	97.0	92.0
Aggregate	13.0	13.0	13.0	75.0

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel base	6.196	6.196	6.196	6.196
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$45.17	$44.50	$42.50	$42.83
No. 2 bundles	$30.50	$30.17	$28.50	$28.83
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	30-31.5	30-31.5	30-31.50	27.50
Lead, St. Louis	12.80	12.80	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.125	102.125	102.625	96.50
Zinc, E. St. Louis	12.00	12.00	12.00	11.00

Advice on Using Data Processing

Data processing can become an important part of a company's buying procedure.

Purchasers in companies using data processing equipment point out its benefits and problems to Philadelphia meeting.

▪ Where does data processing fit into the buying function? How can it improve purchasing? And what's the best plan for installing it?

Philadelphia area purchasers took a look at these and other questions during a forum session on "Data Processing's Place in Purchasing." Speakers at the forum, sponsored by the Purchasing Agents' Assn. of Phila., pointed out both the benefits and the problems.

Don't worry that data processing will reduce purchasing's status, says James M. Hill, Jr., purchasing agent at the Lester, Pa. plant of Westinghouse Electric Corp. By eliminating tedious paperwork it will have just the opposite effect, he notes. Purchasers using data processing have more time for value analysis, negotiating with vendors, expediting, and long-range planning. In addition, the equipment makes purchasing a more useful and valuable department in the company.

Speed and Accuracy — Another speaker—J. R. McAllister, manager of purchasing, Government and Industrial Div., Philco Corp., adds, "With data processing equipment you'll be able to make decisions faster, more accurately, and on the basis of more data."

RAMAC 305: Data processing unit for purchasing department includes (from right to left) control console, memory disk section, tubes, card punch, and printer. (Photo from International Business Machines Corp.)

Don't let the equipment frighten or overwhelm you, both panel members warn. "Remember you've got to direct the machine on what you want it to do," says Mr. Hill. "It doesn't do any thinking. You must spell out every action you want taken. And there can't be any loopholes."

Study Equipment — Purchasing agents should not be concerned about the way the equipment actually operates. "Be interested in not how it does it, but in what it does," says Mr. Hill. He urges would-be buyers to make a full study of all the equipment on the market before making any decisions.

Once it's decided to install data processing in purchasing, he recommends these steps:

1. If possible, set up a systems and methods group, preferably on a company-wide basis. The group should examine long-range plans for feeding data into the machine.

2. Study the purchasing department's activities in detail. Take nothing for granted. Find out exactly what methods are used in carrying out operations. Reduce methods to basic, inter-related steps.

3. Match these present systems and procedures to the operating sequence of the equipment for maximum results.

John L. Sullivan, sales representative, International Business Machines Corp., points out even small companies can take advantage of data processing for purchasing duties. Where leasing equipment isn't practical, he suggests, some service centers will rent out time when machines can be used.

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Ingot Allotment May Squeeze Users

Customer position on order books may not count for too much when steel is shipped.

Much depends on how producers allot ingots to product lines. Another factor: Customer quotas.

▪ Steel users face a double squeeze when mills start up.

Other factors beside their position on mill order books may decide how much steel they get—and when. These factors are (1) the allotments mills make of ingots and semi-finished steel to product lines; and (2) sales quotas set up on most products.

Pressure on Sheet—Much ingot output will probably be earmarked for sheet mills as operations resume. With shortages critical among sheet users, mills will try to feed all the ingots they can into sheet production. Adding to the pressure will be the heavy sheet needs of automakers.

If ingot output is disappointing —a definite prospect — products feeling the pinch will include structurals, bar, wire and pipe.

Buyer Limits—Beyond this problem are the limits set by mill quotas in the months ahead. Sheet products will be on allotment for at least six months. Where direct customer quotas are not yet in, mills have put district sales offices on allotment. And the net result is the same.

Plate mills expect to use quotas through the first quarter and probably the second. Other products to be on quota: Structurals, tinplate, and bar.

Customers are scrambling for delivery position even before shipments start. "Everybody wants to know why they can't get on the books in the first two weeks," says one steel executive.

"Either that or they want to get more than their quota. I think every order on our books has been rescheduled about three times. And they probably will be three times more before the steel is delivered," he adds.

Government Orders—Generally, mills have two approaches to these changes. Some make all those possible. Others are holding off, waiting to see how schedules shape up when production resumes.

Recent government rules on post-strike delivery of defense steel orders (see p. 171) will also affect the market. Mills with defense-rated orders must fill them by the end of the month after the month operations resume or 45 days after resumption.

Galvanized Sheet — Even after steel mills start up, galvanized sheet users will be unable to reach normal inventory levels for twelve months. That's the opinion of Seymour Waldman, president of Rolled Steel Corp. Mill, warehouse, and user inventories of galvanized have been completely depleted during the past two months, he adds. Shortages existed even before the July steel shutdown because galvanized is an improved product in great demand, Mr. Waldman says.

Tinplate—Tinplate stocks in canmaker plants are badly depleted. However, the canmakers have managed to find enough supplies to take them almost through a booming crop year. But the most serious shortage of all may be ahead. That's the long production cycle needed on tin mill products. And, the Florida citrus crop will be coming in during December and January.

Plates and Shapes — Plate mills expect strong demand during the next six months. Order books are full through the end of the year. In most cases the mills are on a quota system. They generally have not opened up for the first quarter.

Standard structurals are booked for many months ahead. Wide flange beams are another product which should be in heavy demand during the first half of 1960. Foreign sources of structurals are not offering much help to users at the moment.

Pipe and Tubing—Jobbers are running out of standard pipe. They placed heavy orders with mills in July and August. Lately, new orders have tapered off. But another wave is expected soon. One mill estimates buttweld orders should run 10 to 12 weeks shipping time when mills start up.

Oil producers are feeling the pinch on oil country products. Downriver depots are out of the more popular sizes of oil country seamless. Heavy ordering is expected in view of the depleted stocks.

Line pipe bookings are strong. However the projects can't be definitely firmed up until steel deliveries are certain.

PURCHASING AGENT'S CHECKLIST

How industry can get help with its problems from the Business and Defense Services Adm. P. 165

Mail processing at U. S. post-offices will be speeded by automatic letter sorter. P. 169

Getting more for your metalworking dollar—coated metals. P. 199

COMPARISON OF PRICES

(Effective Oct. 20, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Oct. 20 1959	Oct. 13 1959	Sept. 22 1959	Oct. 21 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

	Oct. 20 1959	Oct. 13 1959	Sept. 22 1959	Oct. 21 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$46.50	$46.50	$45.50	$45.50
No. 1 steel, Phila. area	44.50	44.50	41.50	40.50
No. 1 steel, Chicago	44.50*	42.50	40.50	42.50
No. 1 bundles, Detroit	39.50	39.50	39.50	35.50
Low phos., Youngstown	47.50	47.50	45.50	46.50
No. 1 mach'y cast, Pittsburgh	54.50*	53.50	53.50	51.50
No. 1 mach'y cast, Phila.	53.50	53.50	52.50	49.50
No. 1 mach'y cast, Chicago	64.50*	63.50	62.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$45.17*	$44.50	$42.50	$42.83
No. 2 bundles	30.50*	30.17	28.50	28.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30-31.50	30-31.50	30-31.50	27.50
Copper, Lake, Conn.	31.50	31.50	31.50	27.50
Tin, Straits, N. Y.	102.125†	102.125	102.625	96.50
Zinc, East St. Louis	12.00	12.00	12.00	11.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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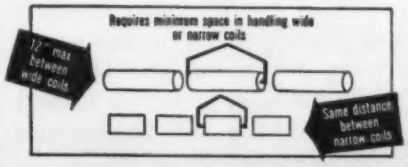

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Turnings Lead Market Upward

Prospects of ore shortages in the coming months send prices for turnings up in several areas.

Senate Small Business Committee asks anti-trust investigation of Luria Brothers by Justice Dept.

■ The Government's intention to intervene in the steel strike has been reflected in higher scrap prices reported in many districts. Dwindling scrap generation is another factor behind higher prices.

Turnings registered some of the sharpest increases, after months of trailing other grades. Prospect of a serious ore shortage in the months ahead is beginning to put pep in these long-time dead items.

Committee Hits Luria — Members of the Senate Small Business Committee this week called for an investigation by the Dept. of Justice of Luria Brothers, Inc., for possible violation of anti-trust laws. The report also charged domination of the Scrap Iron & Steel Institute by Luria Brothers.

Luria Brothers pointed out that the majority report was not unanimous, stated that the Federal Trade Commission had held over 100 hearings on the same charges and that the case was still pending.

Allegations Denied—The Institute replied that "the contention that the Institute is dominated by one member is false; the setup of the Institute precludes this."

Both the Institute and Luria Brothers cited individual reports of Committee members disagreeing with the majority report.

Pittsburgh—All grades of scrap showed strength as the startup of steel operations was awaited. A late railroad list brought prices that were up sharply from last month and from earlier lists this month. Industrial scrap generation has fallen off abruptly and figures to lag behind scrap consumption in the early weeks of the startup. Scrap men reason this condition will put pressure on dealer stocks.

Chicago — A breakthrough that began in crusher prices spread through the entire Chicago list this week, carrying prices up $1 and to as much as $4 on a few grades. Blast furnace, one of the depressed grades, made the swiftest comeback. Smaller mills, anticipating tougher pricing in December when present scrap stocks will be low, are pushing harder for scrap.

Philadelphia — Brokers report there are some indications that mills aren't going to rush in and buy scrap immediately following a back-to-work call. However, this isn't likely to hold prices in check. Export is still making heavy demands on scrap and domestic orders will only increase competition for available material.

New York—Heavy melting steel has risen sharply as dealers hold back on material against reopening of mills. Shoveling turnings rose to a top of $16, and other blast furnace grades are up smaller amounts sympathetically. Heavy breakable cast now tops $38 per ton.

Detroit—It may be a week or two before ordering shows signs of perking up, dealers say. Some local mills have mountains of scrap in their own yards. Others have had it stored in dealer yards for post-strike delivery.

Cleveland—Dealers are growing increasingly bullish, feeling mills will soon need heavy shipments because of ore shortages. Bids for scrap from plants are also bounding upward, with some production turnings being bid at $30 a ton.

St. Louis—Scrap steel prices continued their upward spiral in this area. Supplies are tight and dealers aren't too anxious to sell.

Cincinnati—The market is treading water with some shipments to area mills in operation, but no great tonnages are involved. Dealers are bullish, and rail scrap prices have been bid up in the area—indicating the growing optimism.

Birmingham — Apparently expecting higher scrap prices when the steel strike ends, some consumers are stocking up. Reflecting the strength of foundry steel, random length rails and rail crops advanced $2 a ton. Cast grades were firm after two recent declines.

Buffalo—Optimism here has been growing as the return-to-work movement appears imminent. Most dealers feel prices will be higher when mill operations resume. However, prices are unchanged.

Boston — Export and domestic shipments add up to very little doing in this market. Everyone is still waiting for the settlement of the steel strike. However, the combination of sales and optimism has been enough to move prices upward.

West Coast—Exporting to Japan continues at a brisk pace. The Coast's scrap business is marking time, but prices are very firm. Some dealers report mills have a three-month supply of scrap stockpiled.

Houston—The market is one of watchful waiting. The district mill is unlikely to purchase much scrap if the steel strike ends. It has its largest scrap inventory in history.

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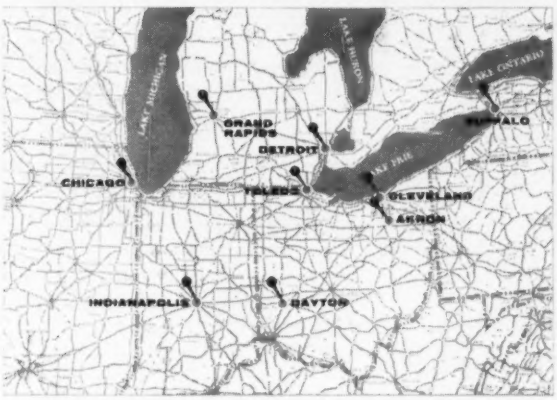

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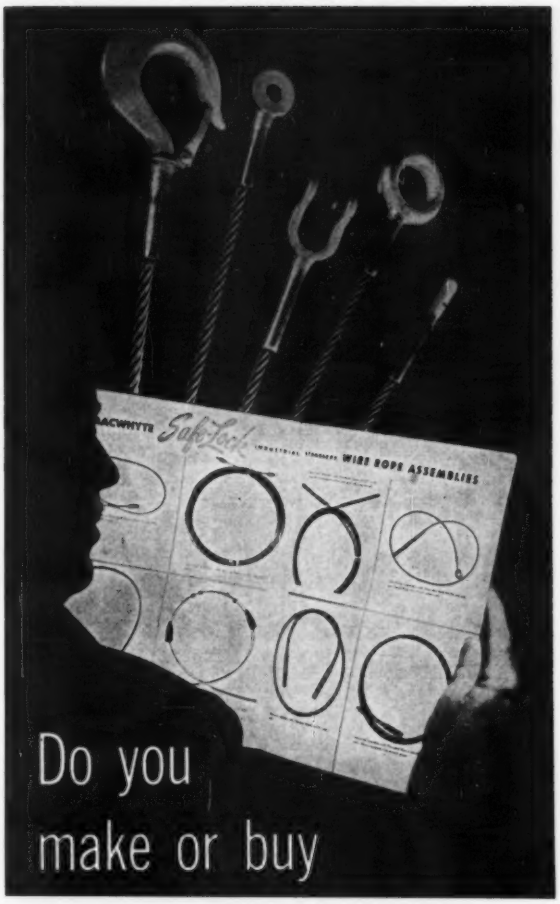

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So whether you make or buy — let us give you the benefit of our suggestions. You can rely on our recommendations, for we are wire-rope manufacturing specialists.

Catalog 5601 available on request.

172

MACWHYTE
Wire Rope COMPANY
2906 Fourteenth Avenue, Kenosha, Wisconsin
WIRE ROPE WITH A PURPOSE.
TO SERVE YOU BETTER!

SCRAP PRICES *(Effective Oct. 20, 1959)*

Pittsburgh

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	47.00 to 48.00
No. 1 factory bundles	53.00 to 54.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	53.00 to 54.00
Heavy turnings	37.00 to 38.00
No. 1 RR hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	59.00 to 60.00
Rails 2 ft and under	64.00 to 65.00
RR specialties	59.00 to 60.00
No. 1 machinery cast.	54.00 to 55.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate, ¼ in. and heavier	55.00 to 56.00
Low phos. 2 ft and under	53.00 to 54.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Rerolling rails	67.00 to 68.00
Rails 2 ft and under	63.00 to 64.00
Angles and splice bars	58.00 to 59.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	55.00 to 56.00
No. 1 machinery cast.	64.00 to 65.00
Cupola cast.	57.00 to 58.00
Cast iron wheels	51.00 to 52.00
Malleable	65.00 to 66.00
Stove plate	53.00 to 54.00
Steel car wheels	55.00 to 56.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	23.00 to 24.00
Mixed bor. short turn.	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	47.00 to 48.00
Low phos. 2 ft punch'gs	49.00 to 50.00
Elec. furnace bundles	47.00 to 48.00
Heavy turnings	34.00 to 35.00
RR specialties	48.00 to 49.00
Rails 18 in. and under	65.00 to 66.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	47.00 to 48.00
Cast iron car wheels	48.00 to 49.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	53.00 to 54.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	25.00 to 26.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	47.00 to 48.00
Rails, random length	53.00 to 54.00
Rails, 18 in. and under	61.00 to 62.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	28.50 to 29.50
Machine shop turn.	21.50 to 22.50
Shoveling turnings	26.50 to 27.50
Low phos. plate	47.00 to 48.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	34.50 to 35.50
No. 1 dealer bundles	41.50 to 42.50
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	42.50 to 43.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Cut structural & plates, 2 ft & under	49.00 to 50.00
Drop forge flashings	41.50 to 42.50
Low phos. punch'gs plate	48.00 to 49.00
Foundry steel, 2 ft & under	41.00 to 42.00
No. 1 RR hvy. melting	46.50 to 47.50
Rails 2 ft and under	60.00 to 61.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	58.00 to 59.00
No. 1 machinery cast.	56.00 to 57.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	225.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 busheling	36.00 to 37.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	18.00 to 19.00
Low phos. plate	41.00 to 42.00
Structurals and plate, 2 ft and under	42.00 to 43.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	24.00 to 25.00
No. 1 RR hvy. melting	49.00 to 50.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	50.00 to 51.00
RR specialties	50.00 to 51.00
Cupola cast.	55.00 to 56.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	46.00 to 47.00
Cast iron car wheels	48.00 to 49.00
Rerolling rails	65.00 to 66.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 special bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	45.00 to 46.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	49.00 to 50.00
Rails, 18 in. and under	54.00 to 55.00
Angles and splice bars	45.00 to 46.00
Rerolling rails	63.00 to 64.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks	41.00 to 42.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	31.00 to 32.00
No. 2 dealer bundles	22.00 to 23.00
Machine shop turnings	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	25.00 to 26.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.00 to 38.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Drop forge flashings	37.00 to 38.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Heavy breakable cast.	38.00 to 39.00
Mixed cupola cast.	47.00 to 48.00
Automotive cast.	52.00 to 53.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	75.00 to 85.00
430 bundles and solids	90.00 to 95.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	18.50 to 19.50
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	33.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	47.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	33.00
No. 2 bundles	20.00
Machine shop turn.	16.00
Shoveling turnings	18.00
Cast iron borings	18.00
Elec. furn. 1 ft and under (foundry)	$47.00 to 48.00
No. 1 cupola cast.	47.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	20.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$47.50 to 48.50
Unstripped motor blocks	39.50 to 40.50
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	34.00 to 35.00

S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE

Rub specimen with emery paper to obtain clean surface. Add 1 drop of 10 percent hydrochloric acid; allow 1 minute reaction time. Add 1 drop of 10 percent potassium ferricyanide; after 30 seconds, if red, green or yellow-brown color appears — or no color — sample belongs to nickel alloy group. Add 1 drop of concentrated nitric acid and wait 1 minute. If there is a black precipitate, the sample is probably "S" MONEL.

Here is how to test for "S" MONEL!

This nickel-copper alloy containing approximately four percent silicon is an age-hardenable cast material. Because of its high strength, hardness and unusual resistance to destructive chemical action, it has many industrial applications.

One of "S" Monel's most valued qualities is its ability to resist galling or seizing when it is in rubbing contact with other metals where little or no lubrication is possible. This anti-galling quality is additionally useful if a corrosive condition also exists.

Because of its unusual composition, it is important that it be separated from other scrap. Our personnel, equipment and strategically located facilities, are specifically geared to supply you with dependable segregated alloy metals in any required amount. We welcome your inquiry.

Luria Brothers and Company, Inc.

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Magnesium Banks On Auto Market

Greater use of magnesium by automakers could bring a surge in magnesium output.

Until now, potential users have shied away because there was only one domestic source.

▪ Automotive was the word heard most around the corridors and meeting rooms of the annual Magnesium Assn. meeting in New York this week.

Yet there wasn't a single speaker on the two-day program who talked specifically about magnesium in this industry. And officially aircraft is still recognized as the leading single market.

Clearly an overwhelming number of the members of this meeting see automotive as the key to magnesium's future. And they are optimistic

Tied to Automotive—H. Y. Bassett, president of Calumet and Hecla, owner of 70 pct of Alabama Metallurgical Corp., second primary magnesium producer in the U. S., said: "Many potential big volume users have coyly shied away from such usage while there was only one available producer in the field. They require an alternate source of supply." (Alamet has been in production about two months.)

The only market Mr. Bassett named specifically was automotive.

J. S. Kirkpatrick, of Brooks and Perkins, owner of the other 30 pct of Alamet, indicated that any real increase in the use of magnesium by the automakers would have to be classed as a breakthrough. He feels an increase of just one pound of magnesium per car would bump primary output close to industry capacity.

Production Estimates — Entire output this year will hit about 45,000 tons. There are production estimates of about 55,000 tons for 1960. No one will even hazard a guess past this. The main reason: The vast difference any increase in auto use would make.

On price, rumors were flying but no one would go on record. Edward Perkins, vice president of Alamet says the company is using the highly economical production methods devised by a former part owner of the new company, Dominion Magnesium of Canada, Ltd. He expects Alamet to reach full capacity, 7000 tons, by next Jan. 1 and operate close to that level for the entire year. Over 6000 tons will be sold on the open market.

But Mr. Perkins says Alamet could operate even more economically at an output of 14,000 tons. The plant was built with expansion to this level in mind.

Price Trends — Mr. Kirkpatrick says magnesium is competing more and more on a final cost basis with other materials. And he says the trend is favoring magnesium.

The whole picture seems to spell a lower magnesium price when sales pick up to where the industry can produce in enough volume to cut per pound production costs. There is little doubt the industry expects automakers to take the lion's share of that output.

Copper

Clyde E. Weed, chairman of the Anaconda Co., has pretty well summed up the feeling growing in the U. S. copper producing industry since the beginning of the year.

"We believe the capacity to produce copper should always be greater than the demand," he said.

And he followed this opinion with the logical conclusion, "We are not interested in a high price for copper. We believe there should be a reasonably stable price so most mines can make a profit on their investment, and the consumer can receive copper at a price competitive with other metals."

Stable Prices?—What does this mean to the copper consumer? "I believe the industry is better prepared today to follow sound business principles which will inevitably lead to better marketing practices and more stability in prices," reported Mr. Weed.

It means the industry is willing and able to go all out to hold prices down in times of strikes or other events that might limit the supply.

Tin prices for the week: Oct. 14—102.375; Oct. 15—102.25; Oct. 16—102.00; Oct. 19—102.125*; Oct. 20—102.125.*

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	30-31.50	30.00	9/9/59
Copper (CS)	33.00	30.00	9/1/59
Copper (L)	31.50	30.00	9/9/59
Lead, St. L.	12.80	11.80	8/24/59
Lead, N. Y.	13.00	12.00	8/24/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.00	11.00	9/22/59
Zinc, N. Y.	12.50	11.50	9/22/59

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 298.**

There's just One Rule at Bristol Brass...

To make every pound of strip, rod and wire the way we would want it, if we were buying it

Bristol-Fashion
means Brass at its best

THE BRISTOL BRASS CORPORATION • SINCE 1850, MAKERS OF BRASS STRIP, ROD AND WIRE IN BRISTOL, CONNECTICUT
Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.63	.....	52.86	55.82
Brass, Yellow	48.65	49.19	48.59	52.06
Brass, Low	51.48	52.02	51.42	54.79
Brass, R L	52.48	53.02	52.42	55.79
Brass, Naval	53.29	.....	47.10	56.70
Munts Metal	51.35	.....	46.66	.....
Comm. Bz.	53.92	54.46	53.86	56.98
Mang. Bz.	56.62	.....	50.28	.....
Phos. Bz. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 33.86

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.75-$6.25; alloy, $7.75-$10.00; Bar, HR or forged, commercially pure, $4.25-$5.00; alloy, $4.25-$7.50; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.40
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz.... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $225 to $227
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $18 to $20
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.25
No. 120 ..... 28.00
No. 123 ..... 27.00
80-10-10 ingot
No. 305 ..... 33.50
No. 315 ..... 31.50
88-10-2 ingot
No. 210 ..... 42.00
No. 215 ..... 37.75
No. 245 ..... 33.50
Yellow ingot
No. 405 ..... 23.75
Manganese bronze
No. 421 ..... 26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.00-25.25
0.60 copper max. 24.75-25.00
Piston alloys (No. 132 type).. 26.75-27.75
No. 12 alum. (No. 2 grade)... 23.50-24.00
108 alloy 24.00-24.50
195 alloy 26.50-27.50
13 alloy (0.60 copper max.)... 24.75-25.00
AXS-679 (1 pct zinc) 23.75-24.75

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 24.00-25.00
Grade 2—92-95% 22.75-23.75
Grade 3—90-92% 21.75-22.75
Grade 4—85-90% 21.25-22.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	20¾	18⅞
Red brass	24¼	23½
Comm. bronze	25¼	24½
Mang. bronze	19⅜	18½
Free cutting rod ends.	19⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 28
No. 2 copper wire 25
Light copper 23¾
*Refinery brass 24½
Copper bearing material 23½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27½
No. 2 copper wire 24½
Light copper 22½
No. 1 composition 22
No. 1 comp. turnings 21½
Hvy. yellow brass solids 16
Brass pipe 15½
Radiators 16½

Aluminum

Mixed old cast. ..... 14 —15
Mixed new clips ..... 16½—17
Mixed turnings, dry ..... 14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 24¼—24½
No. 2 copper wire ..... 22¼—22½
Light copper ..... 20¼—20½
Auto radiators (unsweated). 14 —14½
No. 1 composition ..... 18½—19
No. 1 composition turnings.. 17 —17½
Cocks and faucets ..... 14¼—14¾
Clean heavy yellow brass ... 12¾—13¼
Brass pipe ..... 14¼—14¾
New soft brass clippings .... 14¾—15¼
No. 1 brass rod turnings .... 12 —12½

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 5½— 5¾
Old zinc ..... 3¾— 4
Zinc routings ..... 2¼— 2½
Old die cast scrap ..... 2¼— 2½

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 20-23
Old sheet Monel 26-28
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8¾— 9¼
Battery plates (dry) ..... 4¼— 4½
Batteries, acid free ..... 2½— 2¾

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 59 —60
Auto babbitt ..... 40 —41
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 14 —14½
Siphon tops 42
Small foundry type ..... 10¼—10¾
Monotype ..... 10¼—10¾
Lino. and stereotype ..... 9¼— 9¾
Electrotype ..... 7¾— 8¼
Hand picked type shells .... 6 — 6½
Lino. and stereo. dross ..... 2¾— 3¼
Electro dross ..... 2¾— 3¼

(Effective Oct. 19, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S16, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.00 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.90 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Oct. 19, 1959)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*			
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75 lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.

*Electrogalvanized sheets.

(Effective Oct. 19, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.975 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,I3, W8,N4 K2,W1*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5 C13,C13*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Wheeling, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.35 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.85 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Oct. 19, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pc.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective Oct. 19, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky....	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	16.60
Midwest	17.00

(Effective Oct. 19, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	17.	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*.s	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.50
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.50
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1⅛" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	41

Semi-finished Hex Nuts

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller	65

Rivets

Base per 100 lb

½ in. and larger	$12.85

Pct. Off List

7/16 in. and smaller	15

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

C-1018 Steel Full-Finished Cartons Bulk	
42	
23	
..	
..	

¼" through ⅝" dia. x 6" and shorter	59
¾" through 1" dia. x 6" and shorter	45

48
32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	36.00
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	16.00
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.20
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery† Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24				
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99					
Boston**	.10	10.52	11.27	11.82	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.35	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.05	10.35	8.62	9.16	8.79	10.88	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.02	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston		8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11				
Milwaukee**	.15	8.83	10.49	11.19	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York**	.10	10.52	10.59	11.40	12.14	10.77	10.84	10.09	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	9.07	10.73	11.02	10.73	9.00	9.76	9.17	11.43	17.48	16.48	21.58	19.33
St. Paul	.15	8.94	9.31	10.47	8.99	9.45	9.53	9.70	11.49		15.41		20.83

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼ x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅜"; cold drawn—15/16" to 2⅜" round; Hot-rolled 4140—⅞" to 2⅜" round, cold drawn—15/16" to 2⅜" round.

†† 10¢ zinc. † Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Oct. 19, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $103.50; (15.51–16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	40.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R5*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge, Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

(Effective Oct. 19, 1959)

Available in Stainless Steel, Silicon Bronze, Brass, Aluminum and Steel

JACOBSON NUT MFG. CORP. Kenilworth, New Jersey

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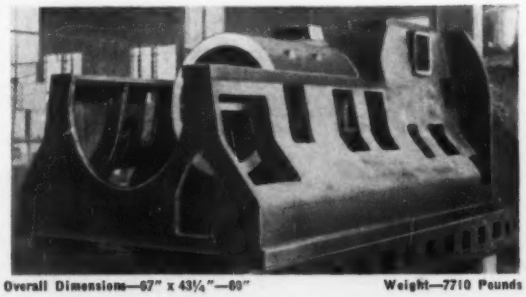

Overall Dimensions—87" x 43¼"—80" Weight—7710 Pounds

This casting was Dry Sand Molded in flasks. Larger, heavier castings are made in pits, also using Dry Sand techniques. Whether the castings you need are classified as usual or unusual, we are anxious to prove to you that Kutztown castings are accurately and economically produced. We invite your inquiry.

We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW".

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KUTZTOWN FOUNDRY & MACHINE CORP.

KUTZTOWN 25, PENNSYLVANIA

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 39.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk)	37.15	39.95	41.15
0.07% max. C		35.10	37.90	39.10
0.10% max. C		34.35	37.15	38.35
0.15% max. C		33.60	36.40	37.60
0.30% max. C		32.10	34.90	36.10
0.50% max. C		31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...		28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 2000 lb up to carloads	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.45	21.25
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovenadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Oct. 19, 1959)

Misifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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Measurably greater accuracy has always been a competitive advantage of Ritco "Bright Finish" Forgings. Made to close-tolerance specifications, these flawlessly finished forgings require minimum machining . . . have smooth, accurate surfaces which speed up assembly, save hours of production time and trouble. Their dense, fibrous structure and controlled grain flow concentrate extra strength and toughness at points of greatest shock and stress . . . assure maximum impact resistance and fatigue strength in key parts.

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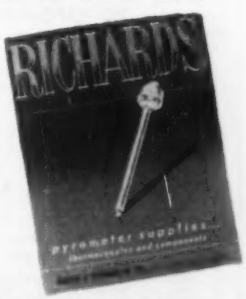

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CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

ELECTRICAL POWER
EQUIPMENT IN STOCK
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. F.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
1	2250	New Elliott	Enc. F.V.	600	200/300
1	2200	G.E.	MCF	600	400/500
1	1750	New Elliott	Enc. F.V.	250	175/350
4	1500	New Whse.	Enc. F.V.	525	600
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
1	940	Whse.	QM	250	140/170
2	940	S.S.	Enc. F.V.	600	800/1000
2	800	G.E.	MCF	250	400/750
2	765	Allis. Ch.	MHC	550	1012/1350
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
2	400	G.E.	CY-275	300	1000/1500
2	325	Allis Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-102 B.B.	230	1200
1	200	Rel. B.B.	T-664-D.P.	240	850
1	200	Whse.	CB-207-4	250	850/1200
1	150	Cr. Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	TLC-74	250	1150/3500
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.	CDP-125, B.B.	230	1750
1	150	A.C.	E.V.B.B.	250	450/1200
1	120	G.E.B.B.	TLC-50	250	1950/5000
1	120	Rel. B.B.	1050T	230	575/900
1	100	Whse.	SK-180	230	450/1100
1	100	G.E.	CDP-145	230	1750
1	80	Whse.	SK-122.9	240	2000/4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850
1	60/75	Rel.	1050T	250	350/1050
1	30/40	Whse. B.B.	SK-131, TEFC	230	500/1500
1	25/33	Rel. B.B.	TT563	240	300/1200
1	40	Rel. B.B.	385F. TEFC	250	500/1500
1	30/40	Rel. B.B.	T-564-D.P.	240	300/900

MERCURY ARC RECTIFIERS

3—150 KW, G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.

2—150 KW, G.E., Ignitron, 245 V. D.C.—230 V. A.C. air cooler transformers with controls.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1700	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	500	G.G.	900	125/250	440
1	500	G.G.	900	250	2300/4600
1	500	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	500	G.E.	1200	250	440
1	500	G.E.	1200	125	440
	100	Cr. Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	81160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
3	1000	G.E.	CA/FA	1	13800 x 230/460
2	833	A.C.	OISC	1	4800/2400 x 480
1	750	Wagner	IPC-16	3	13200 x 480
2	750	G.E.	Pyranol	1	4800x85/55-255/165
2	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS
230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

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Used Machines Ideal For Parts Maker

Used machines cost less and can be installed faster than new machines.

A parts maker says he is happy because his firm thought quickly and bought used equipment.

▪ A well satisfied if anonymous Midwest auto parts supplier last week confided how he couldn't be happier over his $250,000 purchase of used machinery last year.

"We had been turning out our regular parts at the regular rate plus about 200 per month of a new design part," says the purchasing agent. "We were able to squeeze in the 200 without too much trouble on the machines in the shop. Suddenly our quota of the new units was jumped from 200 to 3500 and we still had to turn out our regular run of the old parts.

More Practical—"The shop engineers were frantic. Delivery dates on new machines were far too long. But we were able to bring in 12 good used grinders, radial drills and balancers. We got them for about 35-40 pct of the price of new ones and they were installed in 6-8 weeks instead of the 6-11 mos. quoted for new machines."

Not only did the machines save the day for this firm but they are still in use even though the crisis is over. For all manner of spot jobs, good used machinery is regularly used and has worked out well.

Money Saved—The firm is also having a special World War II era lathe reconditioned. The economics are an eye-opener on the virtues of used machinery. This lathe ironically was used in the same plant during World War II, then disposed of through a Defense Plants Corp. sale. It languished in a warehouse for years. But someone thought of it during discussions of a new job to be done at the plant after seeing the $80,000 price on a new machine. So the oldtimer was bought back for $2500 as is. It is being reconditioned for $6500 including freight so will finish up at about $9000. Engineers at the plant are familiar with it. They know it won't quite hold the tolerances or go as fast as a new model. But they're happy to settle for the difference in price.

"If we need a machine for a single job like drilling one hole, reaming or turning, we will always go to a used machine first," says the purchasing agent. "Also for many other jobs we have found that for the money and the job involved, the used machine is a greater value than a new machine."

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1950 or Later -- 1950 or Later -- 1950 or Later -- 1950 or Later

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Coolant system
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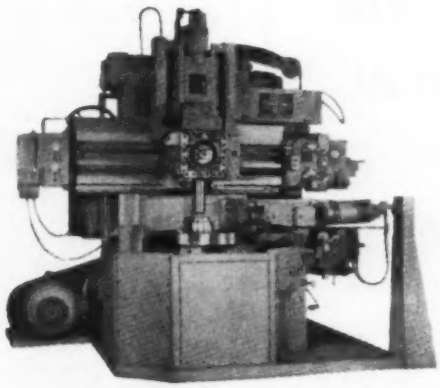

AUTOMATIC SCREW MACHINE

1⅝" CONOMATIC 6 Spindle, Serial No. 835TA, New Approx. 1953

1⅝" CONOMATIC 6 Spindle Automatic Screw Machine, complete electrics, Serial No. 8356TA, New Approx. 1953

BORING MACHINERY

No. 2112A EX-CELL-O Single End Boring Machine, Serial No. 1507, New Approx. 1956

No. 112C EX-CELL-O Single End Boring Machine, Serial No. 5951, New Approx. 1952

3¾" CINCINNATI-GILBERT Table Type Horizontal Boring Mill, Serial No. 667, New Approx. 1954

42" BULLARD Man-Au-Trol Vertical Turret Lathe, Serial No. 25691, New Approx. 1953

42-50" NILES, Vertical Boring Mill, Turret on Rail Side Head, Serial No. 23947, New Approx. 1953

No. 30H BULLARD Man-Au-Trol Horizontal Shaft Machine, 3 Spindle, Serial No. 25526, New Approx. 1950

42" BULLARD Cutmaster, Vertical Turret Lathe, 200 RPM, Serial No. 25308, New Approx. 1950

BROACHES

3 Ton CINCINNATI Vertical, 48" Stroke, Serial No. 3E1V1U-5, 1951

5 Ton LaPOINTE Vertical, 42" Stroke, Serial No. 55058, New Approx. 1955

5 Ton CINCINNATI Vertical Duplex, Surface, Serial No. 4E2U5A-1, New Approx. 1954

15 Ton FOOTE-BURT Duplex Vertical, Electrics, In-Out Table, Serial No. 17047, New Approx. 1953

20 Ton LaPOINTE Horizontal Broach, Serial No. 53107, New Approx. 1953

DRILLS

6'-17" CARLTON Radial, Right Angle Base, Serial No. 384038, New Approx. 1955

No. 36HO BAKER S.S. Vertical, 40" Rotary Table, Serial No. 15419, New Approx. 1954

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W-6 BAUSCH Multiple Drill, Serial No. 8143, New Approx. 1954

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RB-10 ESSA Shaving Press, Serial No. 124504, New Approx. 1957

No. 7 BUFFALO Billet Shear, Auto. Feed, Serial 5CU-965B, New Approx. 1957

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MT 15 DAVID BROWN Gear Hobber, Serial No. 466, New Approx. 1955

No. 7125A FELLOWS Gear Shaper, Serial No. 26450, New Approx. 1950

No. 1873 MICHIGAN Shear Speed Gear Machine, Serial No. 1956, New Approx. 1950

GRINDERS

10"x30" LANDIS Mod. HIW, Multi-Wheel Cylindrical, Serial No. 514-5, New Approx. 1953

10"x72" NORTON Mod. CTU Cylindrical Cam-O Attach., Serial No. 25143, New Approx. 1954

14"x36" NORTON Angle, Complete Electrics, New Approx. 1952

25"x72" LANDIS Crankpin, Never Used, Serial No. 473-29, New Approx. 1952

42"x72" NORTON Univ. Cyl., Serial No. C23129, New Approx. 1950

48"x72" LANDIS CHW, Hyd. Univ. Cyl., Serial No. 477-22, New Approx. 1956

No. 112AH BRYANT Int., 2 Spindle, Serial No. R-9463, New Approx. 1950

No. 107 BRYANT Internal, Serial No. J-9346, New Approx. 1951

No. 271 HEALD Sizematic Internal, Serial No. 30316, New Approx. 1950

No. 272 HEALD Plain Int., Long Base, Serial No. 13190, New Approx. 1952

No. 1209 BRYANT Internal, Serial No. J-9597, New Approx. 1951

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No. 713 MICROMATIC 2-Spindle, Serial No. 138, New Approx. 1952

No. 721 MICROMATIC Micro-Size, Serial N721-152, New Approx. 1953

LATHES

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60" MONARCH T Air Tracing Attachment, Serial No. T3558, New Approx. 1953

60" MONARCH, Model NA, Right Angle T, Air Tracing, Never Used, Serial No. T-37090, New Approx. 1952

No. 4L GISHOLT Heavy Duty Turret Lathe, Complete Electrics, Serial No. 984-8, New Approx. 1950

No. 5DLEX POTTER & JOHNSTON Automatic Turret Lathe, Air Chuck, Serial No. 55404, New Approx. 1950

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4-48 CINCINNATI Duplex Hydra, Serial No. 3B42D1W-2, New Approx. 1951

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No. 2 CK KEARNEY & TRECKER Dial Type Plain, Serial No. 7-6727, New Approx. 1950

No. 3 CINCINNATI Dual Power Vertical, New Approx. 1950

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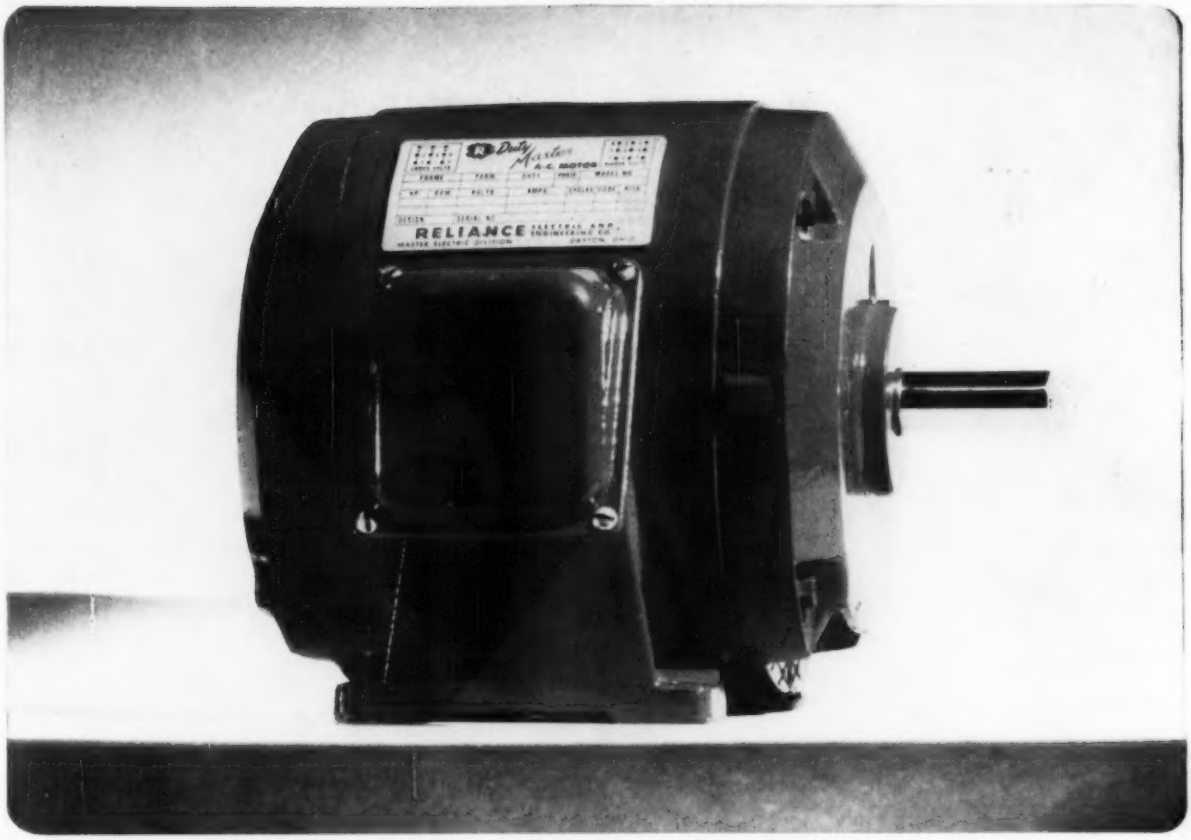

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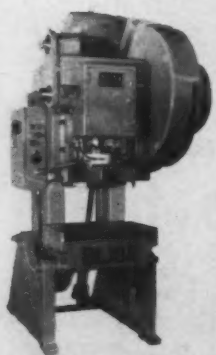

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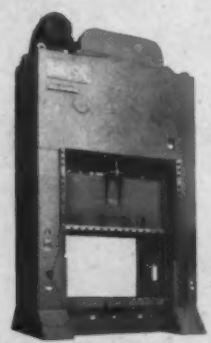

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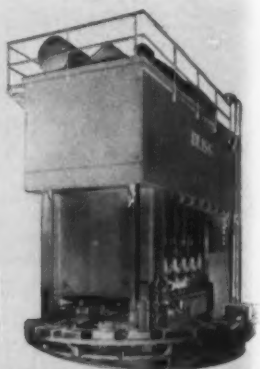

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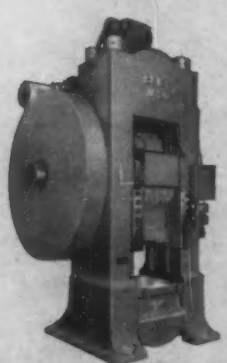
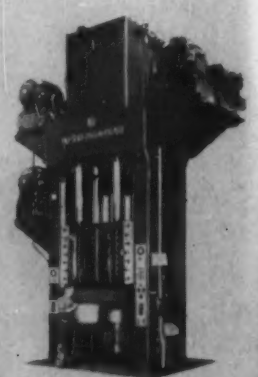


KNUCKLE JOINT PRESSES . . . for slow, powerful application of pressure at near-bottom stroke. Bliss builds them from 75 to 10,000 tons capacity in 40 standard models for coining, embossing, extruding, sizing and swaging.

FORGING PRESSES . . . for production of turbine blades, crankshafts—hot forging, cold coining and other operations. Built in a number of sizes, from 300 to 4000 tons capacity, to standard and special design.

TOGGLE PRESSES . . . Double and triple action designs with quick advance and return speed features; modern electronic controls and automatic lubricating systems. From giant "automotive" sizes to compact units for small parts.



HYDRO-DYNAMIC© PRESSES . . . single action or double open rod construction or closed, 20 tons capacity to 35,000 or even more, standard design or special high speed models, electronic controls—Bliss has built them all.